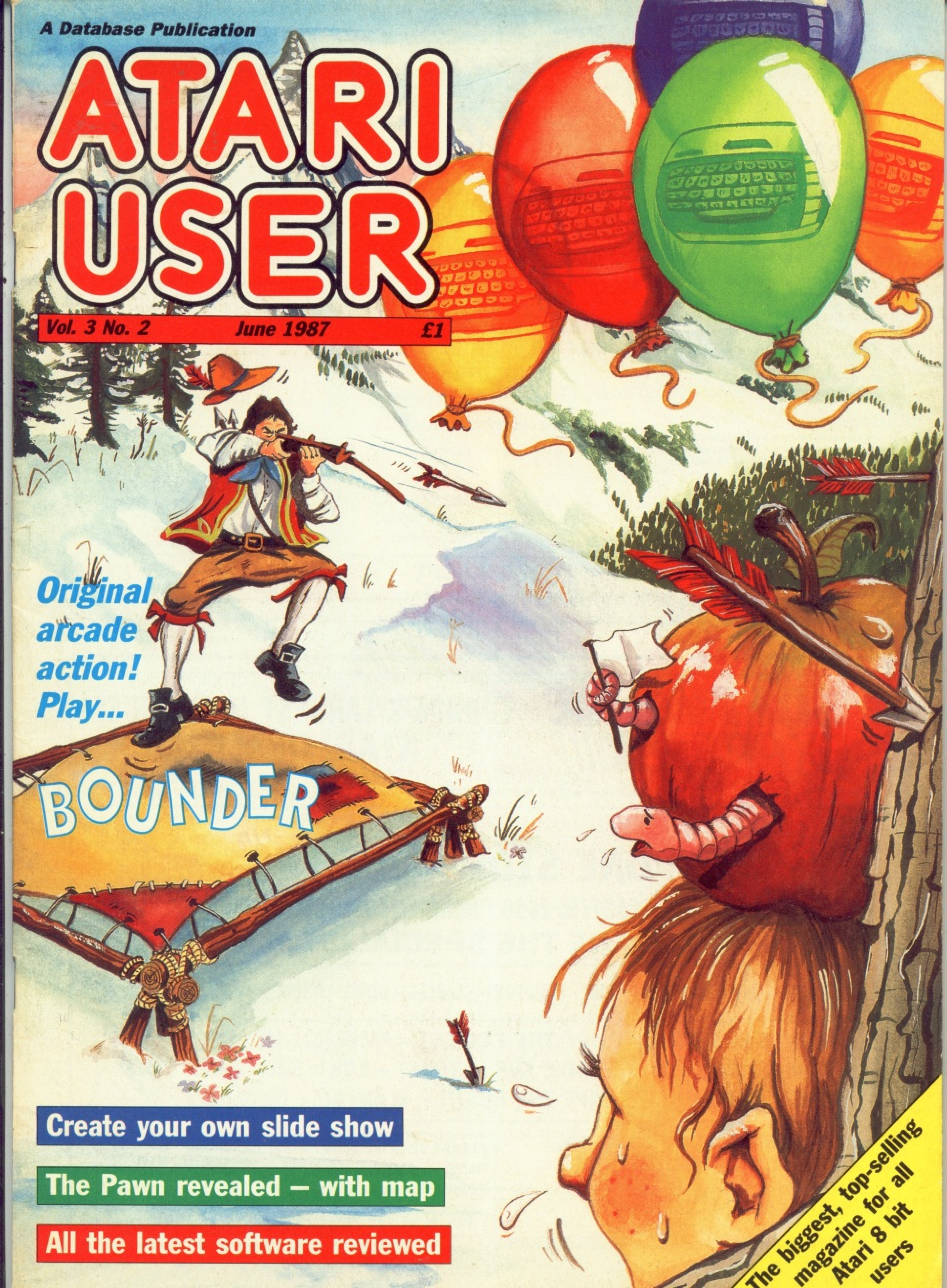
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Vol. 3 No. 2 June 1987 £1



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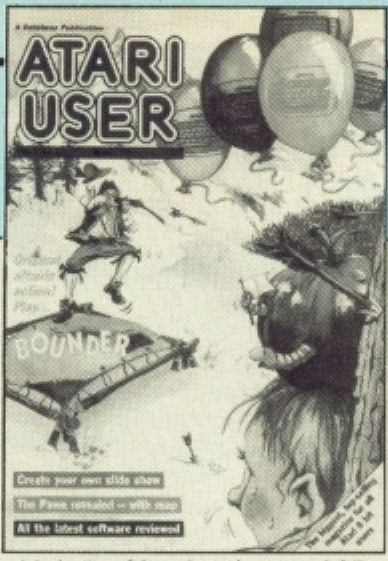
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Vol. 3 No. 2 June 1987

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Published by:
Database Publications Ltd,
Europa House, 68 Chester Road,
Hazel Grove, Stockport SK7 5NY.

ABC 33,573 January-June, 1986

Subscription rates for
12 issues, post free:

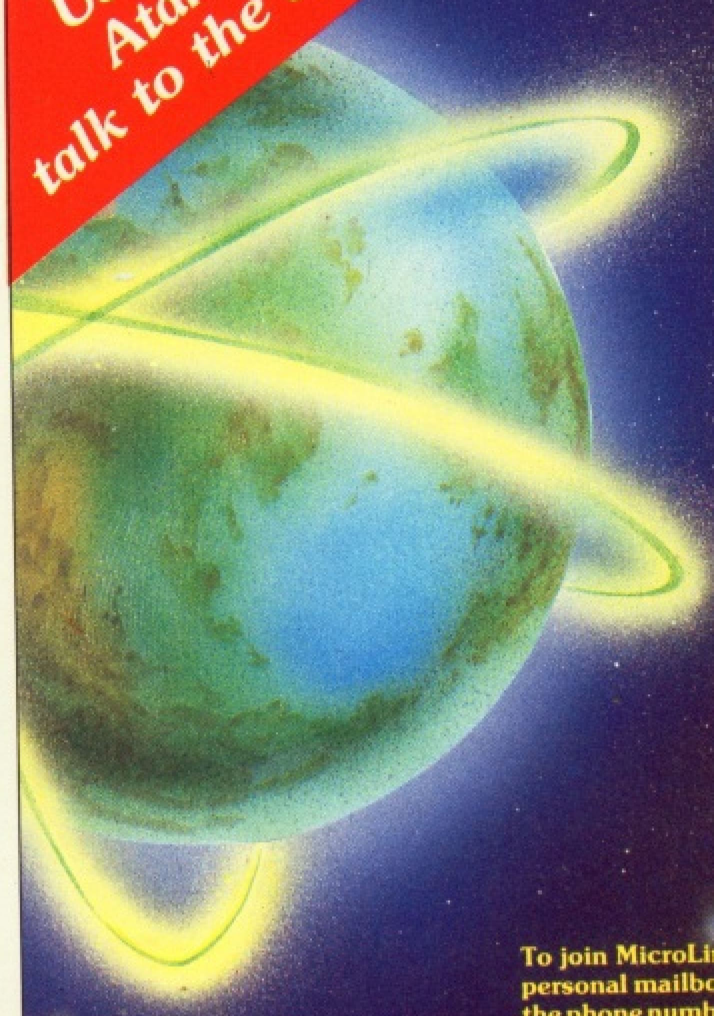
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Contents

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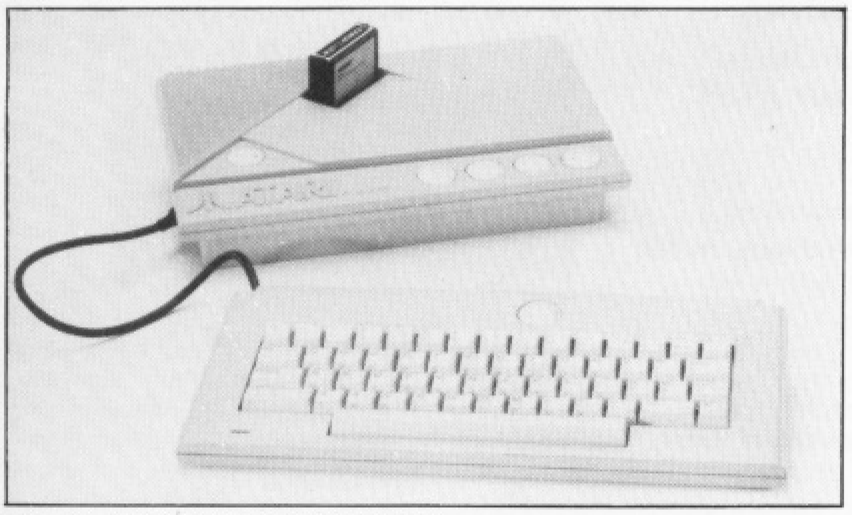
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AT6



The XE, Atari's new games machine

Support new machine, software houses urged

BRITISH software houses have a great opportunity to make money worldwide if they weigh in with support for the new games machine, Atari boss Jack Tramiel is asserting.

He told journalists and dealers at the recent Atari Computer Show that he had just raised $75 million of long-term backing in Europe.

This meant finances were in order and the product range was right. "We are ready to go", he said.

"We need your support but on the other hand we are spending $10 million promoting Atari in the US this year. We hope you software people will find a home there; if you try we will support you with everything we can.

"If we all work together we are going to make it big".

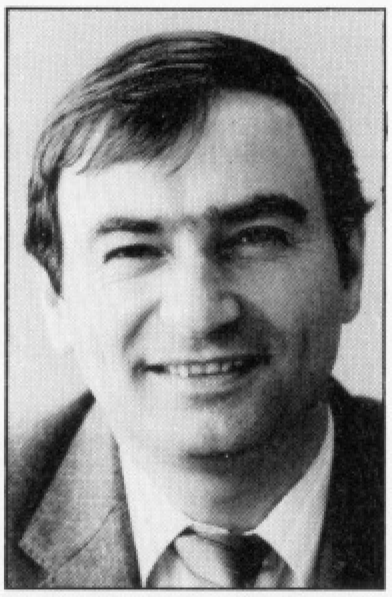
With $200 million in the bank and "all petrol tanks full" Atari was ready to take on the world, he boasted.

"Everything is being plugged in; we are going to be a major force".

The Atari chairman said he could smell success in the air in Britain now that Bob Gleadow was in charge. "He has made all the difference".

Until Gleadow's arrival, Atari UK was losing money. This year it was expected to break even and next move into profitability.

Gleadow revealed he would expect to turn over £30 million this year. The least he could expect next year was £50 million, he said.



Bob Gleadow . . . "He made all the difference", said Jack Tramiel

Big sales expected

HIGH on the list of new hardware at the Atari Computer Show was the new games machine console.

Still without a firm release date, the cartridge-based machine will cost £89.95.

It will be expandable to run all existing Atari 8 bit software on cassette. The joystick, data recorder and light gun come with a keyboard for about £40. This produces a full 64k computer system for £129.95.

Atari chairman Jack Tramiel said at the launch that more than 400 pieces of software were available for the machine even before it was launched.

Because of the promotional effort Atari was putting into the machine around the world – particularly in the US – it was going to be a big seller, he promised.

8 BIT CHESS ARRIVES

COLOSSUS 4 Chess has been released for the Atari 8 bit.

CDS Software (0302 21134) says this is the first 3D chess game for the machine and claims it is the strongest program of its kind.

It features a backtrack facility, problem solving mode and handicapping.

The 8 bit version requires 48k of ram and costs £9.95 on cassette and £14.95 on disc.

Earnings soar

ATARI Corporation earned more than four times as much in the first quarter of this year as it did in the same period last year.

Income was $9.3 million compared with $1.8 million in the first three months of 1986 – a 412 per cent rise.

Worldwide sales in the quarter were nearly double those for the period in 1986.

Cash registers rang up a total of $65.1 million compared with $44.8 million last year – an increase of 45 per cent.

During the period Atari opened new sales offices in Spain and Sweden, and appointed a new general manager to concentrate on improving US sales.

Atari has completed a $75 million Euro-dollar bond issue. The company says the proceeds will be used to expand its business through capital expenditures and acquisitions in the computer field and related areas and for general corporate purposes.

New mission for Floyd

AT last there is a sequel to Planetfall, featuring one of interactive fiction's favourite characters, Floyd the lovable robot. American publisher Infocom has released the Atari XL/XE version of Stationfall in which you are enlisted in the Stellar Patrol and sent on a mission with the playful Floyd.

Toast of the show

SOFTWARE houses showed their commitment to cartridge games for the new 8 bit machines at the show.

The public responded, too. They crowded into the Novotel on the Friday to make it the best first day ever, 1,000 up on previous opening sessions.

So many people had wanted to exhibit that organisers, Database, had booked more space. The 70 or so exhibitors reported an excellent response from an informed public.

Software publishers gave a universal thumbs up to the new games machine pledging lots of support for it and a staggering variety of new software was unveiled with every sort of utility and game on offer.

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Revolt against games image

SCIENCE teacher Glenn Leader is so fed up with people saying Atari micros are only for games that he has started a counter movement.

He is recruiting like-minded Atari users for a new special interests group called Sigatari.

"The group was set up to combat what many people consider Atari computers to be – that is, purely games machines", he told *Atari User*.

"I believe you don't have to shoot blobs to have fun. There is music, robotics, programming, control technology, interfacing techniques and much much more available with Atari.

"One of our aims is eventually to adopt a language – Forth perhaps – bearing in mind the limitations of Basic and the difficulty of learning machine code.

"We are also developing a contact service for members with similar interests, a Help line for Atari-related problems, and a bulletin board".

No war casulties

FEARS that the US-Japan trade war would affect Atari's UK operation have been dispelled by British boss Bob Gleadow.

Because Japanese computers now cost twice as much in the US following the introduction of tariffs, it was suggested that Atari might flood the market there and hold back on manufacturing for Europe. But Gleadow explained that Atari manufacturing was operated separately for each side of the Atlantic.

"I can say that the present trade relationship between the US and Japan will not affect UK availability and pricing", he said.

HERO FLASH FLIES IN

SPACE crusader Flash Gordon is off on another mission to save the world, this time courtesy of the Atari 8 bit series.

In Mastertronic's latest release the evil Ming has targeted Earth with planet-killer missiles. To stop him destroying life as we know it you take the part of superhero Flash and foil the plot.

Ming must die if the Earth is to live – he carries the missile controls with him and only by destroying them can you hope to succeed. Unfortunately your spaceship has crashed into the jungle on Ming's world and you only have 24 hours left.

Flash Gordon costs £2.99 from Mastertronic (01-377 6880).

CREATIVE DEAL

CREATIVE Sparks Distribution has just signed a major deal with Atari – because it believes the company now knows what it's doing.

Vince Holton, CSD marketing manager said: "We firmly believe that 1987 will be Atari's year.

"It is evident that both consumers and dealers are becoming excited about the variety of Atari products."

The deal, says Holton, is part of Atari's attempt to improve on its distribution.

He said CSD talked to Commodore as well, but in the end they persevered with Atari because "the pricing was more attractive and the company had its act together better".

The Gallup Chart Top 20 Atari Software

This Month	Last Month	Title (Software House)	Price
1	1	**BMX Simulator** *Code Masters*	1.95
2	2	**Colony** *Bulldog*	1.99
3	5	**Silent Service** *Microprose*	9.95
4	•	**Football Manager** *Addictive*	2.99
5	3	**Green Beret** *Imagine*	8.95
6	14	**Four Great Games** *Micro Value*	3.99
7	17	**Leaderboard** *Access-US Gold*	9.95
8	•	**Arkanoid** *Imagine*	8.95
9	•	**Hover Bover** *Mastertronic*	1.99
10	7	**LA Swat** *Mastertronic*	1.99
11	4	**Gun Law** *Mastertronic*	1.99
12	15	**Ninja** *Mastertronic*	1.99
13	8	**Spiky Harold** *Firebird*	1.99
14	6	**Despatch Rider** *Mastertronic*	1.99
15	•	**Bubble Trouble** *Players*	1.99
16	18	**Warhawk** *Firebird*	1.99
17	11	**Crystal Raider** *Mastertronic*	1.99
18	12	**Molecule Man** *Mastertronic*	1.99
19	13	**Red Max** *Code Masters*	1.99
20	•	**Who Dares Wins 2** *Tynesoft*	7.95

Compiled by Gallup/Microscope

While budget titles seem to dominate the chart, this month sees four non-budgets in the Top Ten – with Arkanoid going straight in at number eight. We'll have a review in the next issue.

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- Supports double, Dual and Single Densities.
- Sector SKEW is now no longer required to obtain Hi-speed as with US Doublers.
- Other Special features are: Slow down, Fast write, Fast read, Drive write lock, Skew on/off, Fast formatting.
- Fast write with verify. This system is faster than other systems which write without verify.
- A double sided operating system disk is supplied which offers the following:
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  Track Tracer, Diagnostic tester, 48k and 128k Disk Backup utilities.
- The PLATE can be made invisible to software detection by either Slow down or 1050 emulation.
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Speed up Dos

A superb Dos utility for 64k XL/XEs from SIMON ROBINS.

WAITING for the Dos menu to load can get very frustrating after hours of typing. So why not keep the two Dos files in memory at the same time? A complete waste of space I hear you all cry. But not if you find an area of memory that the Atari doesn't normally let you use.

This program uses the unused area of memory under the operating system to hold the DUP.SYS file and allows the file to load at machine code speed – a great improvement on the old method. The area of memory is also used to save the program space that the DUP.SYS file will sit in when loaded.

In other words it will act as a MEM.SAV file, leaving your programs intact. Let me explain how to change your old tortoise Dos into a high speed hare.

Type in the listing, save it and type RUN. The program will take about 10 seconds to run. It will then load Dos and select option H to write Dos files for you. To be on the safe side insert a blank formatted disc: Press Return, and follow the prompts to copy the system files on to this disc. You now have a new master disc which can be used to update any other Dos disc.

To check that all is well, turn off the computer and reboot using the new disc. Return to Basic and type DOS again. This time – and subsequently – the Dos should come up almost instantly. If at any stage things do not proceed as described, recheck the program and try again.

This modified Dos can be used with Basic, assembler or any application program that normally uses Dos 2.5.

```
98 REM DOS 2.5 MEMSAV MODIFICATION
99 REM WRITTEN BY SIMON ROBINS 6/2/87
100 GRAPHICS 0:? "PLEASE WAIT 10 SECS"
110 DIM A$(120):TRAP 400
120 READ A$
130 IF A$(1,1)="$" THEN GOSUB 300
140 FOR X=1 TO LEN(A$) STEP 2
150 GOSUB 200
160 POKE START,BYTE
170 START=START+1:COUNT=COUNT+1
180 NEXT X:GOTO 120
199 REM CONVERT ASCII TO HEX BYTE
200 HI=ASC(A$(X,X))-48
210 LO=ASC(A$(X+1,X+1))-48
220 IF HI>9 THEN HI=HI-7
230 IF LO>9 THEN LO=LO-7
240 BYTE=HI*16+LO
250 RETURN
299 REM CONVERT ASCII TO HEX ADDRESS
300 X=2:GOSUB 200:START=BYTE*256
310 X=4:GOSUB 200:START=START+BYTE
320 READ A$:RETURN
399 REM ERROR ROUTINE
400 IF COUNT<>145 THEN ? "DATA ERROR":
STOP
410 POKE 764,57:DOS
1000 DATA $171B
1010 DATA CE01D3A000B1249128C8D0F9A0
1020 DATA D8E625E629A9CFC525D0028425
1030 DATA C529D0028429CAD0E0EE01D360
1040 DATA $1746
1050 DATA 4C4518
1060 DATA $1828
1070 DATA 207618
1080 DATA $183A
1090 DATA 382418A214A0E0A91FD0093824
1100 DATA 18A216A0C0A91DB005852A98A4
1110 DATA 2A85258429A90C852485288D0E
1120 DATA D478201B17A9C08D0ED458A000
1125 DATA 60
1130 DATA $1873
1140 DATA A00160AD9218D00E20A415F001
1150 DATA 60CE9218203A18F003203C188C
1155 DATA 0B174C752000
1160 DATA $193F
1170 DATA 4C4718
1180 DATA $1820
1190 DATA FF
1200 DATA $1824
1210 DATA EA
1220 DATA $1561
1230 DATA A508D0188D9218
1240 DATA $178F
1250 DATA EAEAEA
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
98	5986	99	6944	100	6346
110	3425	120	1273	130	5069
140	4429	150	1880	160	3409
170	5792	180	3060	199	6207
200	3157	210	3535	220	3707
230	3795	240	2633	250	1498
299	6627	300	5639	310	6351
320	3157	399	3705	400	7267
410	2957	1000	1806	1010	5344
1020	5520	1030	5435	1040	1809
1050	1995	1060	1805	1070	1951
1080	1819	1090	5328	1100	5419
1110	5378	1120	5436	1125	1308
1130	1825	1140	5325	1150	5301
1155	2922	1160	1828	1170	2005
1180	1797	1190	1406	1200	1801
1210	1389	1220	1806	1230	3440
1240	1845	1250	2189		

5 LINERS

FLASHING CURSOR
from BRUCE BLACK

ATARI computers possess many powerful features but lack certain cosmetic effects such as a flashing cursor. This can make all the difference to a screen display, and many routines have been published over the years to provide this obviously useful feature.

Unfortunately they usually have these major drawbacks in that all inverse text on the screen flashes in time with the cursor and the routine has to be re-initialised with a USR call every time the system reset button is pressed.

If you only want the cursor to flash and have it stay flashing even after pressing the reset button, this program – CFLASH – is just what you have been waiting for. It consists of three short machine code routines which are copied into page 6 and initialised started by a USR call.

The routine sets the VBLANK interrupt vector to point to the CFLASH interrupt service routine. Once this has been done the CFLASH will continue to run even after the reset button has been pressed.

When an Atari does a warm start after the reset button is pressed it resets the interrupt vectors to default values and removes the CFLASH vector.

Fortunately it is possible to trap the warm start routine, since during its execution the operating system examines the contents of the boot success flag (BOOT?) at location \$9.

If the value is 1 a disc boot was successful and the operating system will jump to the address held in locations \$C and \$D (DOSINI). By reseting the DOSINI vector to point to the reset routine within CFLASH, it is possible to reset the VBLANK vector whenever reset is pressed.

CFLASH also allows cassette users to have this reset protection since it fools the operating system into thinking a disc boot was successful and so calling CFLASH's reset routine.

The cursor flashing is accomplished during the VBLANK interrupt service routine. Each time a VBLANK interrupt occurs it decrements a count. When the count reaches 0 the count is reset and the routine proceeds to flash the cursor.

CFLASH makes use of the value of the character under the cursor, held in location \$5D (OLDCHR) and the memory location of the cursor which is held in locations \$5E and \$5F (OLDADR).

The flashing is produced by toggling the top bit (bit 7) of the location pointed at by OLDADR. This has the effect of changing the state of the character so that if it was normal it is now inverse, and vice versa.

A check is made to make sure that the VBLANK interrupt did not occur during a cursor move, otherwise a character may be reversed before the operating system has saved the correct value of the character under the cursor.

The check is carried out by comparing the value in OLDCHR with the value pointed at by OLDADR. If they are not the same, the cursor flash is aborted and the routine begins counting down again.

The flashing period may be altered while the routine is running by the command "POKE 1607, period" where period is a value between 0 and 255. The smaller the value of period, the faster the flashing effect, except that a value of 0 produces the slowest flashing rate.

```
10 FOR X=1536 TO 1614:READ A:POKE X,A
:NEXT X:X=USR(1536)
20 DATA 104,165,9,41,1,240,14,165,12,
141,43,6,165,13,141,44,6,169,1,133
30 DATA 9,169,39,133,12,169,6,133,13,
162,6,160,45,169,7,32,92,228,96,32
40 DATA 29,6,76,77,160,165,87,208,26,
206,78,6,208,21,160,0,165,93,81,94
50 DATA 41,127,208,6,177,94,73,128,14
5,94,169,32,141,78,6,76,98,228,32
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
10	9841	20	10277	30	10439
40	10481	50	10302		

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SPACE INVADERS
from RICHARD PARKES

WHO said you could'nt put a game into five lines? Well here we have a version of the classic Space Invaders program and the only difference is that you only have one crafty little invader to deal with.

The program makes use of many Atari Basic features, but the one most utilised is the assignment of the values 1 or 0 to a true or false Boolean statement.

For example, the expression X=2 yields a 1 if X is 2, or a 0 if X is not equal to 2. The ON GOTO statement is also used to good effect to give the missing IF.. THEN.. ELSE type structure.

To get the program into five lines you will have to use Basic abbreviations shown, but do not abbreviate the GOTO of the ON GOTO statement, as this cannot be abbreviated to G.

Unfortunately because of the length of the lines you must use the abbreviations and it is not possible to give a GIR with this listing.

```
10 POSITION X,J:? "***";:FOR U=0 TO 1
00*Z:NEXT U:SOUND 0,0,0,0:? "~~~":X=I
NT(9+20*A):Y=1:ON Z GOTO 20:GRAPHICS
0:POKE 752,1:G=20:S=0.2
20 A=RND(0):X=X+(A<C AND X<36)-(A>C A
ND X>1):B=STICK(0):G=G+(B=7 AND G<34)
-(B=11 AND G>0):Q=(G>(X-3) AND G<(X+1
))
30 POSITION G,23:? "  ";:POSITION I,J
:? "   ";:POSITION X,Y:? "";:I=X:J=Y
:D=STRIG(0):P=124:C=0.5:POSITION 15,0
:? "SCORE ";SC
40 IF D=0 THEN COLOR P:PLOT G+2,22:DR
AWTO G+2,1+Y*Q:P=P-92:ON P=32 GOTO 40
:IF Q THEN SC=SC+5:Z=1:S=S+0.02:SOUND
 0,99,0,9:GOTO 10
50 Y=Y+S:ON Y<22 GOTO 20:POSITION 12,
10:? "G A M E  O V E R":? "   PRESS S
TART":ON PEEK(53279)<>6 GOTO 50:POKE
77,0:RUN
```

POS.	POSITION	SO.	SOUND
GR.	GRAPHICS	F.	FOR
G.	GOTO	N.	NEXT

3 DIMENSIONAL CUBES
from MATTHEW CROFT

HERE's a five liner that allows you to draw any number of 3D cubes on the screen. When the program is first run a Graphics 8 screen appears with your first cube drawn and a message asks you to enter the two coordinates of the top left hand edge of another cube to plot.

The cubes can be stacked, put behind, in front and eicher side of any other cube you choose to plot. In fact they can be placed anywhere, but don't enter any points over 280 on the first coordinate or 160 on the second, as this will cause an error 144 – cursor out of range.

If you wish you could add an extra line to reject any points above these settings. To draw a cube behind another simply decrease both previous numbers by 10, and to plot in front of another cube increment by 10.

If you experiment with these plots you can create some amazing effects.

```
1 GRAPHICS 8:SETCOLOR 2,6,3:X=100:Y=1
00:? "   3-D BOXES":COLOR 5
2 ? "ENTER CO-ORDINATES FOR NEXT BOX.
"
3 PLOT X;Y:DRAWTO X+20,Y:DRAWTO X+20,
Y+20:DRAWTO X,Y+20:DRAWTO X,Y:DRAWTO
X+10,Y+10:DRAWTO X+10,Y+30
4 DRAWTO X+30,Y+30:DRAWTO X+30,Y+10:D
RAWTO X+10,Y+10:PLOT X+30,Y+30:DRAWTO
 X+20,Y+20:PLOT X,Y+20
5 DRAWTO X+10,Y+30:PLOT X+20,Y:DRAWTO
 X+30,Y+10:INPUT X,Y:GOTO 2
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
1	11406	2	7208	3	19097
4	17741	5	12029		

MASS FORMATTER
from COLIN FROGGATT

HOW often have you had a pile of discs that you wanted formatting? well here is a five line program that allows you to do that without using that tiresome format option on your Dos discs. You don't have to enter which drive you wish to format, or answer the y prompt: Just get on with the job at hand.

The program uses the Basic command XIO254, #1, 0, 0, "D1", to format the discs. This will format any disc in Drive:D1 in the density of the Dos you boot the system up with. So Dos 2.0 is formatted to single density, Dos 2.5 to enhanced density, Dos 3.0 – 87 Blocks.

LINE BREAKDOWN

Line 1 sets up screen, sets colour registers, turns cursor off and prints the title.

Line 2 prompts you to press start to format the disc.

Line 3 uses XIO 254 to format the disc and sounds a bell when finished.

Line 4 prompts you to continue.

Line 5 reports when an error has occurred.

```
1 GRAPHICS 1:POKE 752,1:POKE 710,0:TR
AP 5:POSITION 1,2:? #6;"* MASS FORMAT
 BY *  * COLIN FROGGATT *"
2 POKE 709,0:POKE 711,10:POSITION 3,8
:? #6;"press start to         format d
isk":IF PEEK(53279)<>6 THEN GOTO 2
3 POKE 709,0:POKE 711,0:XIO 254,#1,0,
0,"D1:":? "}":POKE 709,10:POSITION 3,
12:? #6;"disk formatted"
4 ? :? "       PRESS ANY KEY TO CONTIN
UE ":OPEN #2,4,0,"K:":GET #2,A:CLOSE
#2:GOTO 2
5 GRAPHICS 1:POKE 710,0:? "}":? "}":P
OSITION 1,5:? #6;"ERROR HAS OCCURED
    RETRY FORMAT":FOR T=1 TO 2000:NEX
T T:GOTO 1
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
1	18145	2	34163	3	19008
4	14218	5	22698		

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Customising the system

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IN this final part of our series we look at AUTORUN.SYS machine code files, which will allow you to make your own Basic programs load and run automatically from Dos.

Program I shows our now-familiar colour change routine in AUTORUN-.SYS form. You can see the differences between this and the autoboot versions listed in parts 1 and 2 – only lines 270 to 370 look at all familiar.

Notice first of all that no special header is required in our source code, since the Assembler Editor cartridge will insert one automatically when you assemble the file to disc. To identify it as a binary load file a six-byte header will be placed before the actual machine code.

The first two bytes will be set to 255, the next two will contain the load address and the last two will hold the address at which the load will end. If you had to insert it manually, it would look like this:

```
START  .BYTE 255
       .BYTE 255
       .WORD START
       .WORD FINISH
```

Program I is a conventional AUTORUN.SYS file which loads and runs on power-up, then hands control back to Basic.

Dos extracts the load address and calculates the file length from the six-byte header, then it loads the file into the specified area – or areas, since there may be more similar blocks of data assigned to different places in memory.

After all the blocks have been loaded, it then looks to see if you have stored a run address in RUNAD (736,737). If so, it performs a JSR to that address and executes everything down to the final RTS, then hands control to Basic.

Lines 410 and 420 set RUNAD during the load process to point to the start of our file. If you don't store an address at RUNAD, Dos will give control to Basic as soon as AUTORUN-.SYS has finished loading, without running it.

Alternatively, you can store an address at INITAD (738,739), in which case the code at that address will run as soon as it is loaded, without waiting for the rest of the file.

System Reset handling is not as simple as it was with the boot formats we have been looking at so far. When DOS.SYS was first loaded it set the value of DOSINI to point to its own initialisation routine and, provided you don't want anything extra done during Reset, you should leave this value unchanged.

The OS will then carry out Dos initialisation and hand control straight back to Basic whenever Reset is pressed.

In many cases, however, you will want to run some extra code of your own after System Reset has been pressed, so DOSINI will have to be altered. You could make it point to any address in your own code, but then Dos initialisation would be by-passed thus disabling the Dos file management system disabled.

To get around this problem lines 130 to 160 copy the original value from DOSINI into the operand of *JSR INITDOS*. This effectively transforms line 240 from a simple time delay into an instruction to intitialise Dos. Then lines 170 to 200 change DOSINI so that it points to our extra Reset code, at *WARMST*.

Now when Reset is pressed, the OS jumps via the new value at DOSINI to *WARMST*, carries out the Dos initialisation and then returns to execute all the code between *WMST2* and the final RTS. It then hands control back to Basic.

If you want to extend the Reset routine, put your extra instructions between lines 200 and 210 (renumbering the program, of course), while any extra power-up code should go between lines 260 and 290. If you stick to this layout, your AUTORUN.SYS file will always behave correctly.

Saving Program I to disc is easy. Just type:

```
ASM,,#D:AUTORUN.SYS
```

automatically. Alternatively, you could use Program II to make the same AUTORUN.SYS file from Basic. Notice that in this case the header data must be included in the DATA statements (line 70).

To round things off let's look at an AUTORUN.SYS file which will load and run a Basic program automatically on power-up. Program III is the source code for those readers who are interested.

It inserts a new editor handler which allows you to put a line of text into the computer's text buffer during power-up. When Basic takes control, it will assume that you have just typed that line and hit Return. If the text line contains:

```
RUN"D:
```

followed by your filename, the specified file will load and run as soon as Basic takes control. Program III also changes the text luminance so that the READY message can't be seen while your Basic program is loading. This makes it look more like a commercial disc autoboot.

The source code is for interest only – program IV is the one to use. It starts by putting the machine code into page 6, with 12 blank spaces left for the file name. Then it asks you for a name, such as PROGRAM1.BAS or MENU, and rejects anything that is too short or too long.

You could improve the program by adding more sophisticated checks to ensure that the file name is legal in all respects. The name is inserted into page 6 at the appropriate point in the machine code, then line 70 creates the AUTORUN.SYS file for you.

Now whenever you switch on with that disc inserted, a chain of events takes place. First DOS.SYS is loaded and, after being initialised, it takes control and looks for an AUTORUN-.SYS file on the disc. Once run, our program inserts a text line reading:

```
?CHR$(125): POKE 709,202: RUN"D:filename
```

Basic now takes control, and carries out the instructions in the text line. This clears the screen, makes text visible again, then finally loads and runs the specified Basic program. The net result is difficult to distinguish from a single-stage machine code autoboot.

AUTORUN.SYS is ideal for customising the operating system, or even adding extra facilities to Basic itself, and we will be presenting a few interesting routines in future issues.

→

Program I

```
05 ;PROGRAM I - A SIMPLE AUTORUN.SYS FILE
10 COLOR4=$2C8
20 DOSINI=$0C
30 MEMLO=$2E7
40 RUNAD=$2E0
50 ;
60  *=$1D00
70 ;
80 ;Load address must be above DOS
0110 ;
0120 COLDST
0130  LDA DOSINI ;Store old DOSINI value
0140  STA WARMST+1 ;into operand of
0150  LDA DOSINI+1 ;'JSR INITDOS'
0160  STA WARMST+2
0170  LDA #WARMST&255 ;Insert RESET vector
0180  STA DOSINI
0190  LDA #WARMST/256
0200  STA DOSINI+1
0210  JMP WMST2
0220 ;
0230 WARMST
0240  JSR INITDOS ;Do normal DOS init
0250 ;
0260 WMST2
0270  LDA #148            Change screen border
0280  STA COLOR4
0290  LDA #FINISH&255     Set MEMLO to protect
0300  STA MEMLO           the AUTORUN.SYS file from
0310  LDA #FINISH/256     destruction by Basic
0320  STA MEMLO+1
0330 ;
0340 INITDOS
0350  RTS                 Give control to Basic
0360 ;
0370 FINISH=*
0380 ;
0390 ;Insert the Run address:
0400 ;
0410  *=RUNAD
0420  .WORD COLDST
```

Program II

```
5 REM PROGRAM II - BASIC VERSION OF PROGRAM I
10 REM Writes the code starting at line 70 into an AUTORUN.SYS file
20 TRAP 60
30 OPEN #1,8,0,"D:AUTORUN.SYS"
40 READ D:IF D=-1 THEN GOTO 60
50 PUT #1,D:GOTO 40
60 END
70 DATA 255,255,0,29,39,29
80 DATA 165,12,141,22,29,165,13,141,23,29,169,21,133,12,169,29,133,13,76,24
90 DATA 29,32,39,29,169,148,141,200,2,169,40,141,231,2,169,29,141,232,2,96
100 DATA 224,2,225,2,0,29,-1
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
5	8583	10	16953	20	1390
30	5165	40	5271	50	2875
60	836	70	3747	80	10916
90	10772	100	3896		

Program III

```
05 ;PROGRAM III
10 COLOR1=$2C5
20 EOL=$9B
30 HATABS=$31A
40 OLDVTAB=$CB
50  *=$600
0100 ;
0110 COLDST
0120  LDX #0
0130  STX COUNT
0140 ;
0150 SEARCH
0160  LDA HATABS,X ;Search HATABS to find
0170  CMP #'E ;the Editor's entry
0180  BEQ EFOUND
0190  INX
0200  INX
0210  INX
0220  BNE SEARCH
0230 ;
0240 EFOUND
0250  INX ;Store offset to address
0260  STX POINTER ;of old vector table
0270  LDA HATABS,X ;Store old address, and
0280  STA OLDVTAB ;put address of new
0290  LDA #NEWTAB&255 ;vector table
0300  STA HATABS,X ;into HATABS
0310  INX
0320  LDA HATABS,X ;Repeat with high byte
0330  STA OLDVTAB+1
0340  LDA #NEWTAB/256
0350  STA HATABS,X
0360 ;
0370  LDY #15
0380 ;
0390 COPYTAB
0400  LDA (OLDVTAB),Y ;Copy old vector table
0410  STA NEWTAB,Y ;into NEWTAB
0420  DEY
0430  BPL COPYTAB
0440 ;
0450 SETGB
0460  LDA #NEWGB-1&255 ;Put address-1 of
0470  STA NEWTAB+4 ;new GET BYTE routine
0480  LDA #NEWGB-1/256 ;into new vector
0490  STA NEWTAB+5 ;table
0500  LDA #$04 ;Hide the READY message
0510  STA COLOR1
0520  RTS ;Give control to Basic
0530 ;
0560 ;
0570 NEWGB
0580 ;New GET BYTE routine
0590  LDY COUNT
0600  CPY #ENDSTRING-STRING
0610  BEQ RESTORE
0620  LDA STRING,Y ;Give string characters
0630  INC COUNT ;one at a time to OS
0640  LDY #1 ;Signal success
0650  RTS
0660 ;
0670 RESTORE
0680  LDY POINTER ;Change Editor's entry
0690  LDA OLDVTAB ;in HATABS to point to
0700  STA HATABS,Y ;old vector table
0710  INY
0720  LDA OLDVTAB+1
0730  STA HATABS,Y
0740  LDA #EOL ;Signal end-of-line
0750  LDY #1 ;and successful transfer
0760  RTS
0770 ;
0780 POINTER *=*+1
0790 COUNT *=*+1
0800 NEWTAB *=*+16
0810 STRING
0820  .BYTE "?CHR$(125):POKE 709,202:RUN",34,"D:"
0830  .BYTE "              " ;spaces for filename
0840 ENDSTRING
0850 ;
0860  *=$2E0
0870  .WORD COLDST
0880  .END
```

Program IV

```
5 REM PROGRAM IV
10 DIM A$(13):PRINT CHR$(125)
20 FOR X=0 TO 160:READ D:POKE 1536+X,D:NEXT X:REM store machine code in page 6
30 PRINT "INPUT FILE NAME":INPUT A$
40 IF LEN(A$)<1 OR LEN(A$)>12 THEN PRINT "ERROR":PRINT :GOTO 30
50 FOR X=1 TO LEN(A$):POKE 1678+X,ASC(A$(X,X)):NEXT X:REM insert the file name at the correct place in page 6
60 OPEN #1,8,0,"D:AUTORUN.SYS"
70 FOR X=0 TO 160:PUT #1,PEEK(1536+X):NEXT X
80 END
90 DATA 255,255,0,6,102,6
100 DATA 162,0,142,104,6,189,26,3,201,69,240,5,232,232,232,208,244,232,142,103
110 DATA 6,189,26,3,133,203,169,105,157,26,3,232,189,26,3,133,204,169,6,157
120 DATA 26,3,160,15,177,203,153,105,6,136,16,248,169,67,141,109,6,169,6,141
130 DATA 110,6,169,4,141,197,2,96,172,104,6,192,42,240,9,185,121,6,238,104
140 DATA 6,160,1,96,172,103,6,165,203,153,26,3,200,165,204,153,26,3,169,155
150 DATA 160,1,96,121,6,162,6,63,67,72,82,36,40,49,50,53,41,58,80,79
160 DATA 75,69,32,55,48,57,44,50,48,50,58,82,85,78,34,68,58,32,32,32
170 DATA 32,32,32,32,32,32,32,32,32,224,2,225,2,0,6
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
5	3083	10	4478	20	16419
30	6333	40	11207	50	24167
60	5165	70	7490	80	836
90	3498	100	11330	110	10771
120	10930	130	10727	140	10744
150	9897	160	9968	170	7080

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Battle stations

Product: Astro-Droid
Price: £9.95 (disc) £7.95 (cassette)
Supplier: Red Rat Software, 11 Fennel Street, Manchester M4 3DU.
Tel: 061-835 1055

IS it a bird? is it a plane? No, it's Astro-Droid, the latest release from Red Rat Software. You take on the role of a $200,000,000 machine of destruction, a cyborg, a machine with a human brain – an insane one at that.

You are first presented with an impressive title screen. When the rest of the program loads this changes to a 3D scrolling starfield, with a prompt to press the fire button to start.

Playing in the background is a catchy tune that suits the game's mood very well. This continues to play all the way through the game.

When you press the fire button you are enter the Median Sector and go single-handedly into battle against the evil Reldans to force them back to their own galaxy.

You do this by flying over their 50 mile long neutron-powered starships blasting away at their positronic laser batteries and destroying enemy fighters that attempt to crash kamikaze-style into you.

After you have inflicted enough damage to their craft you move to a bonus level which involves avoiding fighters in deep space.

Once the fighters have been destroyed you progress to another space sector with yet another starship to obliterate.

The first impression is good – the screen scrolls very smoothly, the fighters appear and attempt to dive bomb you. However, after I had been playing a while it began to remind me of Screaming Wings, an earlier Red Rat game. Fighters fly at you in a similar way, even the way your droid moves around the sreen.

This does not detract from the skillful content of the game – the fighters are very hard to shoot, and the wreckage can destroy you if you are not fast enough.

Dotted along the starship are different letters. If you shoot at a letter C you cause your droid to turn into an invisible attack ship, but this transformation only lasts for a limited time.

The time remaining is displayed at the bottom of the screen. If you look closely at the starship the letters XL appear frequently – a nice touch.

This is a one-player game using the joystick in port one. In certain parts of the game you are required to move your droid to the left or right of the screen to indicate if you wish to fly above or below the starships.

The scoring system is easy; and you gain points for blasting the fighters, with bonus points awarded for hitting special targets and for surviving the deep space section.

There are many nice features, such as the ability to fly on either side of the starships. Visible through the ships is a very nicely scrolled starfield which gives the impression of depth.

The way that your droid transforms into the sleek attack ship is smoothly done and does not interfere with the screen's scrolling.

My only quibble lies with the instructions, which are very short and contain an error when telling you how to load the disc version. They indicate that you hold Start and Option keys when powering up your machine. In fact you only hold Option to deselect Basic.

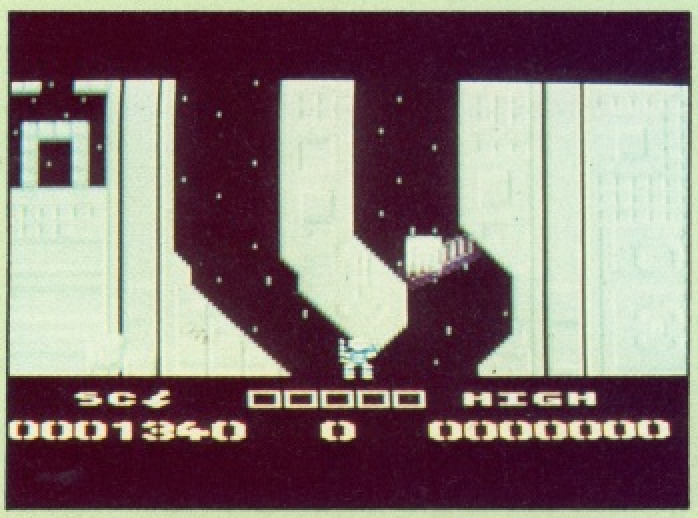
Apart from this, I was very impressed with the game, and if you like to see your enemy vanish in a hail of laser fire this is the one for you.

Neil Fawcett

Sound	*8*
Graphics	*7*
Playability	*8*
Value for money	*7*
Overall	*8*







Fast and frantic



Program: Attack of the Mutant Camels
Price: £1.99
Supplier: Mastertronic, 8-10 Paul Street, London EC2A 4JH.
Tel: 01-377 6880

MINTER Madness is about to burst on to your screen as cut-price king Mastertronic rereleases the games that made Jeff Minter into a megastar.

Minter might be more famous for his C64 games, but he's always had a soft spot for the 8 bit Atari. Attack of the Mutant Camels is the game that started it all.

As with all the best shoot-'em-ups, Mutant Camels is easy to play but almost impossible to master. The plot revolves around your attempts to foil the Zzyaxian's evil plot to destroy the Earth.

These dastardly aliens secretly abducted a herd of camels and have genetically engineered them into 90 foot high, laserbolt-firing, neutronium-shielded war machines that now march relentlessly on their path of destruction. Your job is to stop them.

The countries of the world have united to provide you with a small but highly manoeuvrable ship to fly between the deadly beasts, blast them with neutron bolts (thus wearing down their shielding) and finally destroying them – while avoiding their laser bolts.

I found the best tactic was to hurtle towards the first camel (so you don't waste any time), get behind it and blast away.

Naturally, you should avoid the laser bolts but stay as close as possible as you'll score more hits.

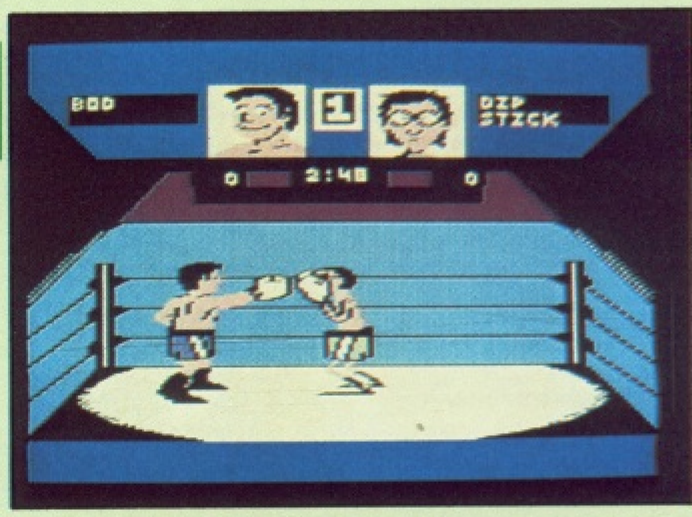
In between waves you must survive a hyperspace hurtle through an asteroid belt, so keep your nerve.

Attack of the Mutant Camels was Jeff Minter's first game and, as far as I'm concerned, it's still the best. Fast, frantic action, now at a budget price. What more could you want?

Tony Hetherington

Sound	7
Graphics	7
Playability	9
Value for money	
Overall	9

It's a knockout!



Program: Fight Night
Price: £9.95 (cassette) £14.95 (disc)
Supplier: US Gold, Unit 2 & 3, Holford Way, Birmingham B6 7AX
Tel: 021-356 3388

FIGHT Night offers five different modes of play – main event, construction, training, sparring and tournament.

Control of your boxer is by joystick and you are limited to eight basic moves – fake or throw a punch to the body or head, put your guard up or down, and move left or right.

Although punches never actually seem to connect, the recipient nevertheless doubles up or jerks his head back as appropriate.

To defeat an opponent in the three, three minute rounds, you must either outpoint him or knock him out.

Each time you land a blow your score goes up and the contender's KO indicator increases. The greater the length of the KO indicator, the closer to being knocked out.

All options are selected from the title screen. The main event has you fighting five plug-ugly computer-controlled boxers, each one stronger that the last.

Construction mode allows you to create up to 24 of your own boxers.

You can select head, body, feet and shorts. Then your creation is either controlled by the computer or by a player and can balance the strengths (100 per cent split between head and body) of the power of the boxer's blow and his resistance to blows.

If the boxer is to be computer-controlled you can also adjust the balance of offensive and defensive moves and the split between action and intelligence.

Sparring mode lets you call up any two boxers to fight. You can have computer v computer (in which case you sit back and watch), player against computer, or with a second joystick, player against player.

Training mode lets you call up any boxer to punch away at a bag. You may operate in Follow or Lead mode at a selected speed, allowing you to practice joystick control as well as being able to evaluate a created boxer's power.

In Follow mode you simply move your joystick in accordance with an illuminated position on a displayed joystick chart. In Lead mode, you can move the joystick at will.

In Tournament mode (disc only), two players can set up various boxers against each other in a knockout competition.

The graphics are of a fairly high standard although the animation is a little on the slow and jerky side.

Presentation is excellent, from the ease of selecting the various options, to such things as the use of an admission ticket as a header screen before a contest.

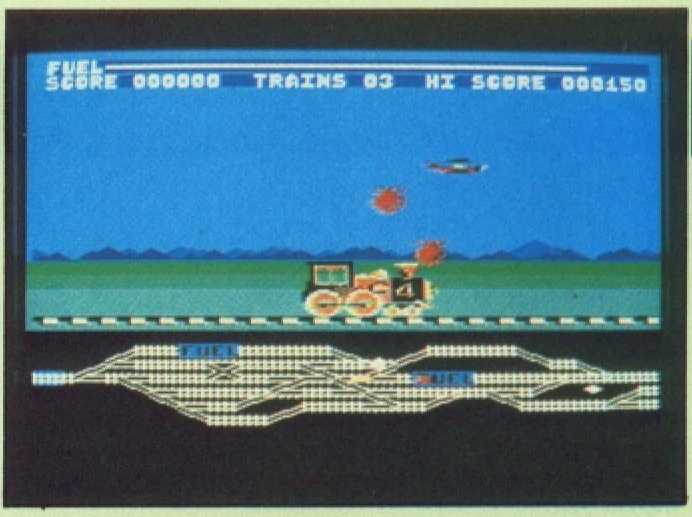
Sound effects are only fair – a little bit of music and simple crashes whenever a punch lands.

All told, Fight Night provides genial, no-nonsense entertainment and is certainly the best boxing simulation around. Good humoured and good value for money.

Doug Wooller

Sound	6
Graphics	8
Playability	8
Value for money	9
Overall	8

All aboard Loco



Program: Loco
Price: £1.99
Supplier: Alligata Software, 1 Orange Street, Sheffield S1 4DW.
Tel: 0742 755796

BRITISH Rail was never like this. Alligata's new release puts you in charge of a classic American steam train on a journey more hazardous than anything Casey Jones ever undertook.

Most of the screen is taken up with a side-on view of an impressive red steam engine.

The engine chugs away to the right along the track, or rather, it gives that impression. In fact, the train stays in the centre of the screen while the background scenery (blue skies, green fields and mountainous terrain) slides smoothly to the left.

At the bottom of the screen is an overhead view of a criss-crossing, six lane railway system. This lets you see some distance ahead and behind and so works as an early warning device.

Your train has a limited supply of fuel and the only way you can take on more is by visiting fuel dumps sited around the system.

To do this you'll need to change lanes from time to time – accomplished by pushing up or pulling down on your joystick.

There are other reasons why you'll need to keep a weather eye open. A dynamite-laden handcart will come rattling along the tracks at frequent intervals. If it hits your train, you're a goner.

Mind you, there are means other than evasive action to deal with that particular peril. A quick pull to the right with your joystick fires a missile – very handy when you're on a collision course with a handcart.

Danger also comes from the skies in the form of planes and airships which drop red bombs. The best way to deal with this aerial bombardment is to fire a blast of smoke upwards from your engine (Smoke that destroys bombs and aircraft? The laws of physics have been rewritten again!).

Holding and releasing the fire button controls the height of your smoke clouds which rise to the desired height and then drift off to the left, hopefully eradicating aerial objects on impact.

There are 10 levels to deal with and a choice of speeds (fast or slow). At least the instructions say there are two optional speeds, but don't tell you how to select them.

No matter what keys I pressed or how I waggled the joystick, I never did find out how to race at top speed.

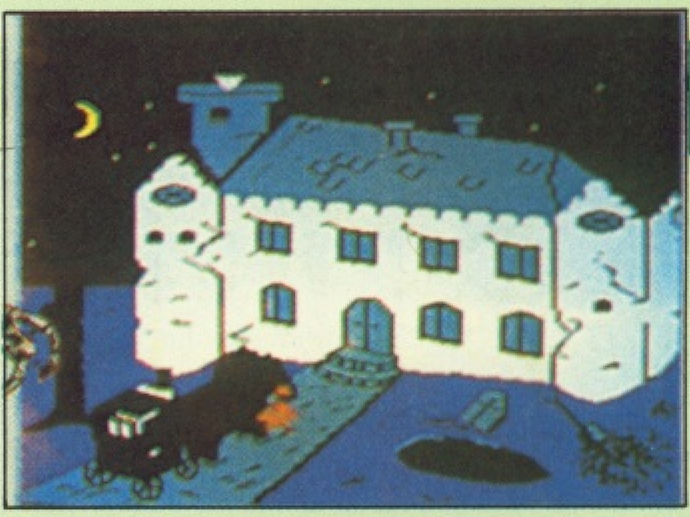
Neither do the instructions mention that there is a Pause facility (key P to pause, anything else to continue).

Loco is excellent value for money. High quality graphics, sound and gameplay make this a must for your library.

Bob Chappell

Sound	*8*
Graphics	*9*
Playability	*8*
Value for money	*9*
Overall	*9*

House to forget



Program: House Of Usher
Price: £1.99
Supplier: Midas Marketing, 35 West Hill, Dartford, Kent DA1 2EL.

ANOTHER platform game, I'm afraid, and not a terribly good one at that even taking into account its cheapness.

The main screen of House of Usher is supposed to represent the reception hall of this ill-famed house.

To enter a room, you simply position your small, rather nondescript, character in front of a door. By pushing forward on the joystick and pressing the fire button the screen will change to show the appropriate room.

Every room offers a series of platform puzzles. Most involve dodging mobile objects such as monsters, cannonballs, boulders, and so on.

You have three lives and touching any object will cost you one, as will mis-timing a jump over a gap between platforms, or falling off a ladder.

In some screens, you must collect items; in others you simply need to reach the exit. One screen has you jumping hidden gaps, the position of which are shown only by a tiny inset map.

When you have successfully negotiated all the rooms you will be allowed to enter a mystery room (the Treasure Chamber). From here you can catapult yourself into the Final Room via a spring.

Every time you enter this last room you will be given the chance to pick a letter of the alphabet to discover whether it forms part of a secret codeword.

What happens in these last two rooms and what results when you discover the code word can only be guessed at, since I have not so far reached them – due in equal parts to my lack of skill and the absence of interest or excitement generated by the game.

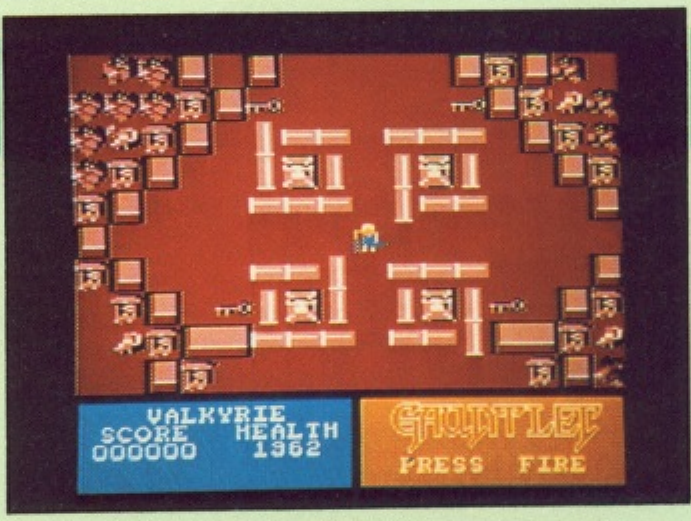
The price is low, but there's no doubt you could find better value in many other budget releases.

Even better, why not save a few pence more and buy Edgar Allan Poe's The House of Usher in paperback form – far more exciting than this game.

Bob Chappell

Sound	*5*
Graphics	*5*
Playability	*5*
Value for Money	*6*
Overall	*5*

Worth the wait!



Program: Gauntlet (minimum 64k)
Price: £9.99 (cassette) £14.99 (disc)
Supplier: US Gold, Units 2 & 3, Holford Way, Birmingham B6 7AX.
Tel: 021-356 3388.

AT last, it's here! I've been waiting for Gauntlet for so long I almost began to think that US Gold wouldn't release it.

If you read the preview of Gauntlet in the April issue of *Atari User* you know that it is a conversion of the arcade game.

The first thing to appear when you load the game is the arcade title screen of Thor the Warrior and Thyra the Valkyrie in action.

Then you choose between a one or two player game, then which character or characters you are going to use (warrior, valkyrie, elf and wizard). I chose the wizard, for his powers with magic. Then you move into the game itself.

The first few levels are easy, compared with what's to come later on. To start with, you only come across relatively harmless ghosts.

But as you get deeper into the game, you come across grunts, lobbers, demons and a friendly character known to his pals as Death.

Keys and potions can be found and used in the dungeons, as well as food and drink to replenish your health. But take care what you consume, as some food and drink is poisoned.

The exits are marked with a large E, and transport you to the next level. One of the later levels is a dungeon filled with exits, except for a few pathways littered with food, drink and treasure.

In this, the exits are more of a disadvantage than anything, although in other levels you may not be able to find the exit, so if you leave the joystick alone for about a minute all the walls turn into exits.

That gives you just an idea of what Gauntlet is like. Play is just a bit slow, compared to the other versions, but it's still good fun. The music is a little rough, but you don't find yourself listening to it that often – you're too engrossed in the action.

The treasure rooms are included as well as levels where shots stun and hurt other players. The selection screen is impressive, using four colours, and the sprites and scrolling are both extremely fluid.

The game is very addictive. You can find yourself collecting treasure in an otherwise empty room, then be attacked by dozens of monsters all at once.

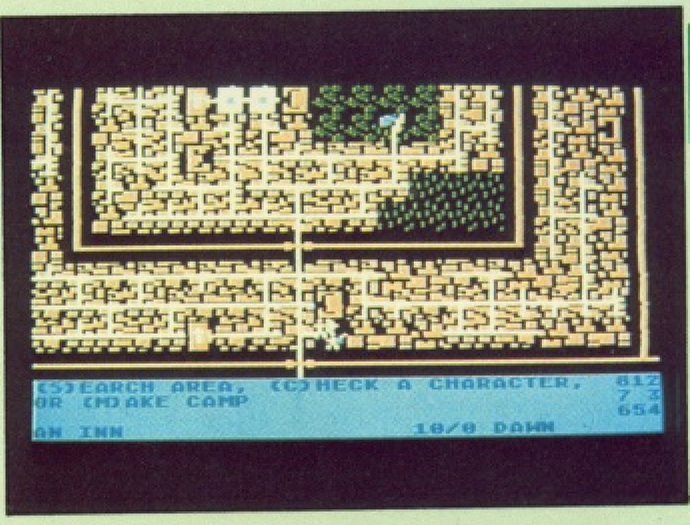
Overall, Gauntlet is totally wicked. Although you only have a single colour shaded screen, the game play more than covers that.

Take my advice: Run the Gauntlet!

Robert Swan

Sound	*8*
Graphics	*9*
Playability	*8*
Value for Money	*9*
Overall	*9*

A wizard time . . .



Program: Wizard's Crown
Price: £19.99 (disc only)
Supplier: SSI c/o US Gold, Units 2 & 3, Holford Way, Holford, Birmingham B6 7AX.Tel: 021-356 3388.

IF you've tried adventures but find they lack depth or restrict your movements, why not try a computer role playing game?

They don't quite match up to the real role-playing action and atmosphere of games such as Dungeons and Dragons and Chivalry and Sorcery, but they do come close.

Wizard's Crown provides you with a massive world of magic, monsters and mayhem to explore. There are towns, dungeons and ancient ruins that SSI claims will take you a 100 hours to complete.

Somewhere in the land lurks the evil wizard Tarmon who stole the Crown of the Emperor. Your quest is to get it back.

If you're to stand any chance of surviving – never mind solving – the game you must manage your party of eight adventurers so that the rangers and fighters are supported by magic-wielding sorcerers, healing priests and lurking, scouting thieves.

Each character has a rating for its strength, dexterity, intelligence and life (health points) as well as specific skills such as fighting, haggling or casting any of the sorcerer's 22 possible spells.

Play is controlled by entering single key commands to move your party around a wilderness map which then expands for combat.

In such a battle each character and monster is moved independently, depending on its dexterity. Single key commands contol moves, attacks, loading and firing bows, casting spells, healing wounds, sneaking by thieves and evasive action such as ducking or zig-zagging.

As your characters survive battles and fight for plunder they will gain in skills, experience and power, equip themselves with magical weapons and powerful potions.

This depth of character and gameplay make up for the elementary graphics and almost constant disc accessing. The result is an enjoyable game that will take months to solve.

Tony Hetherington

Sound	*N/A*
Graphics	*2*
Playability	*8*
Value for money	*8*
Overall	*6*

TECHNOLOGY SO ADVANCED ...



MEMORY
* 512Kbytes RAM (520ST-M, FM)
* 1024Kbytes RAM (1040ST-F)
* 192Kbytes ROM
* 128Kbytes external plug-in ROM option

ARCHITECTURE
* Motorola 68000 Central Processing Unit (CPU) with a clock speed of 8MHz
* 16-bit external data bus
* 32-bit internal data bus
* 24-bit address bus
* 8×32-bit data & address registers
* 7 levels of interrupts
* 56 instructions
* 14 addressing modes
* 5 data types
* DMA (Direct Memory Access)
* real time clock as standard

GRAPHICS
* full bit-mapped display
* palette of 512 colours

Using Atari Monitors (on 520 & 1040):
* 640×400 high resolution - monochrome
* 640×200 medium resolution - 4 colours
* 320×200 low resolution - 16 colours
* 80 column text display (40 col low res)

Using Domestic TV (on 520):
* 640×200 medium resolution - 4 colours
* 320×200 low resolution - 16 colours
* 40 columns × 25 line text display

SOUND AND MUSIC
* 3 programmable sound channels
* frequency programmable 30Hz - 125KHz
* programmable volume
* wave & dynamic envelope shaping
* programmable attack, decay, sustain, release
* Musical Instrument Digital Interface (MIDI)
* MIDI allows connection of synthesisers etc.

STANDARD SOFTWARE
* GEM desktop + TOS operating system
* ST BASIC interpreter/language system

MOUSE
* high precision
* 2 button control
* free with 520ST-FM/1040ST-F
* non slip ball motion sensor
* removable ball for easy cleaning

INPUT/OUTPUT
* MIDI out .... (5 pin DIN) 31.25K baud
* MIDI in .... (5 pin DIN) 31.25K baud
* audio out .. 1.0V DC peak to peak, 10K ohm
* audio in ...... 1.0V DC peak to peak, 10K ohm
* RGB monitor .... 1.0V DC, 75 ohm
* mono monitor .... 1.0V DC, 75 ohm
* mono horizontal scan rate 35.7KHz
* mono vertical scan rate 71.2KHz
* sync .... 5V DC (active low) 3.3K ohm
* modem/serial ...... RS232C, 50 to 19,200 baud
* floppy disk .... 250 Kbits/s
* hard disk .... 11.3 Mbits/s
* mouse .... standard Atari connector
* joystick .... standard Atari connector
* cartridge port .... 128K capacity
* RF output (520ST-FM) .... for TV use

OPERATING SYSTEM
* TOS with GEM environment in ROM
* hierarchical file structure with sub-directories and path names
* user interface via GEM, with self explanatory command functions
* multiple windows + icons
* window resizing, re-positioning and erasing
* drop down menus (selected by mouse)
* GEM virtual device interface

COMMUNICATIONS
* RS-232C serial modem port
* 8-bit parallel printer port
* MIDI port (also for networking use)
* VT52 terminal emulation

KEYBOARD
* standard QWERTY typewriter format
* 95 full stroke keys
* 10 function keys
* 18 key numeric keypad + cursor keys
* variable auto-repeat & key click response
* keyboard processor reduces CPU overhead

... IT'S AFFORDABLE

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Finally, there's a personal computer that not only solves problems like other computers, but also solves the one problem that other computers have created. Affordability. Silica Shop are pleased to present the ST range of personal/business computers from Atari. The ST was designed utilizing the most recent breakthroughs in semiconductor technology, producing a personal computer that performs tasks with fewer parts. Which means it costs less to make. And less to buy. The latest ST computers now include built in power supplies and built in disk drives. The TOS operating system and GEM window environment are now on ROM chips which are already installed in the ST keyboard. This enables automatic instant booting when you switch on. Silica Shop are pleased to offer the complete Atari ST range. Our mail order department is situated in Sidcup and we have 4 retail outlets at Sidcup, Orpington, Lion House (Tottenham Court Rd) and Selfridges (Oxford Street). We have eight years experience of Atari products, longer than any other UK company, and are well established as the UK's No.1 Atari specialist. With a group turnover of over £5 million and in excess of 70 staff, we provide unbeatable service and support. We provide several facilities which you will find invaluable during your Atari computing life and most of these facilities are available **ONLY FROM SILICA**. We suggest that you read through what we have to offer, before you decide where to purchase your Atari ST.

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When you purchase any Atari ST keyboard, you will not only receive the best value for money computer on the market, but you will also receive the following from Atari Corporation as part of the package:

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In addition, we at Silica would like to see you get off to a flying start with your new computer, so we have put together a special **ST STARTER KIT** worth over £100, which we are giving away **FREE OF CHARGE** with every ST computer purchased at our normal retail prices. This kit is available **ONLY FROM SILICA** and is aimed at providing users with a valuable introduction to the world of computing. We are continually upgrading the ST Starter Kit, which contains public domain and other licensed software, as well as books, magazines and accessories all relevant to ST computing. Return the coupon below for full details.

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At Silica Shop, we have a dedicated service department of five full time Atari trained technical staff. This team is totally dedicated to servicing Atari computer products. Their accumulated knowledge, skill and experience makes them second to none in their field. You can be sure that any work carried out by them is of the highest standard. A standard of servicing which we believe you will find **ONLY FROM SILICA**. In addition to providing full servicing facilities for Atari ST computers (both in and out of warranty), our team is also able to offer memory and modulator upgrades to ST computers.

1Mb RAM UPGRADE: Our upgrade on the standard Atari 520ST-M or 520ST-FM keyboard will increase the memory from 512K to a massive 1024K. It has a full 1 year warranty and is available from Silica at an additional retail price of only £86.96 (+VAT = £100).

TV MODULATOR UPGRADE: Silica can upgrade the 1040ST-F to include a TV modulator so that you can then use it with your TV set. This is an internal upgrade and does not involve any untidy external boxes. A cable to connect your ST to any domestic TV is included in the price of the upgrade which is only £49 (inc VAT). The upgrade is also available for early 520ST computers at the same price.

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We aim to keep stocks of all Atari related products and our warehouse carries a stock of £¼ million. We import many software titles direct from the USA and you will find that we have new releases in advance of many of our competitors. Unlike dealers who may only stock selected titles, we have the full range. In addition, we carry a complete line of all books which have been written about the Atari ST. A range as wide as ours is something you will find is available **ONLY FROM SILICA.**

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520ST-M

The affordability of Atari computers is reflected in the price of the 520ST-M keyboard, which is a mere £259 (inc VAT). This version of the ST comes with 512K RAM, as well as a modulator and lead for direct connection to any domestic TV. The price does not include a mouse. In addition, when you buy your 520ST-M from Silica, you will also receive the FREE Silica 'ST Starter Kit'. During 1987, many software houses will be producing games software on ROM cartridges, which will plug directly into the cartridge slot on the 520ST-M keyboard, giving instant loading without the expense of purchasing a disk drive. With the enormous power of the ST, you can expect some excellent titles to be produced, making this the ultimate games machine! If your requirement is for a terminal, then the 520ST-M can fulfill this role too. Leads are available to connect the ST to a variety of monitors, and with the imminent introduction of terminal software on ROM cartridge, the ST provides a low price terminal for business use. If you wish to take advantage of the massive range of disk software available for the ST range, you will need to purchase a disk drive. Atari have two floppy disk drives available, a ½ Mbyte model £149 and a 1Mbyte model £199. Full details of these drives, as well as the Atari 20Mbyte hard disk are available on request. If required at a later date, the mouse may be purchased separately.

£259

520ST-FM

The 520ST-FM with 512K RAM and free mouse, represents a further breakthrough by Atari Corporation in the world of high power, low cost personal computing. This model is the latest addition to the ST family, and is not only powerful, but compact. It is priced at only £399 (inc VAT) a level which brings it within the reach of a whole new generation of computer enthusiasts. When purchased from us, it comes with the FREE Silica 'ST Starter Kit' see paragraph on the left. To make the 520ST-FM ready for use straight away, Atari have built into the keyboard a ½ megabyte disk drive for information storage and retrieval, allowing you easy access to the massive range of disk based software which is available for the ST. This new computer comes with all the correct cables and connections you will need to plug it straight into any standard domestic television set. You do not therefore have to purchase an Atari monitor. If you do require a monitor however, these are available with the 520ST in the following money saving packages:

520ST-FM Keyboard	*Without Monitor*	- **£399** *(inc VAT)*
520ST-FM Keyboard	*+ High res mono monitor*	- **£499** *(inc VAT)*
520ST-FM Keyboard	*+ Low res colour monitor*	- **£599** *(inc VAT)*
520ST-FM Keyboard	*+ Med res colour monitor*	- **£699** *(inc VAT)*

Because the 520ST-FM has its own power transformer built into the keyboard, there are no messy external adaptors to clutter up your desk space. You are left with only one mains lead, serving both the disk drive and the computer. You couldn't ask for a more stylish and compact unit.

£399

1040ST-F

For the businessman and the more serious home user, Atari have their most powerful model, the 1040ST-F with 1028K RAM. This low cost powerhouse can be introduced into a business environment as a stand-alone system, or can support a mainframe computer as a terminal. The 1040ST-F not only features twice as much memory as the 520ST-FM, but also includes a more powerful built-in disk drive. The drive featured on the 1040ST-F is a one megabyte double sided model. The extra memory facility of the 1040ST-F makes it ideal for applications such as large databases or spreadsheets. Like the 520ST-FM, the 1040ST-F has a mains transformer built into the console to give a compact and stylish unit with only one mains lead. The 1040ST-F is also supplied from Silica Shop with a free software package and 'ST STARTER KIT'. In the USA, the 1040ST-F has been sold with a TV modulator like the 520ST-FM. However, for the UK market, Atari are manufacturing the 1040ST-F solely with business use in mind and it does not currently include an RF modulator, this means that you cannot use it with a domestic TV (Silica Shop do offer a modulator upgrade for only £49). The 1040ST-F keyboard costs only £599 (inc VAT) and, unless a modulator upgrade is fitted, will require an Atari or third party monitor. There are three Atari monitors available and the prices for the 1040 with these monitors are as follows:

1040ST-F Keyboard	*Without Monitor*	- **£599** *(inc VAT)*
1040ST-F Keyboard	*+ High res mono monitor*	- **£699** *(inc VAT)*
1040ST-F Keyboard	*+ Low res col monitor*	- **£799** *(inc VAT)*
1040ST-F Keyboard	*+ Med res col monitor*	- **£899** *(inc VAT)*

The 1040ST-F comes with a mouse controller and includes 1Mbyte of RAM. It has a 1Mbyte double sided disk drive and mains transformer, both built into the keyboard to give a compact and stylish unit, with only one mains lead.

£599

ATARI ST

To: Silica Shop Ltd, Dept ATUSR 0687, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX

PLEASE SEND ME FREE LITERATURE ON THE ATARI ST

Mr/Mrs/Ms: .... Initials: .... Surname: ....

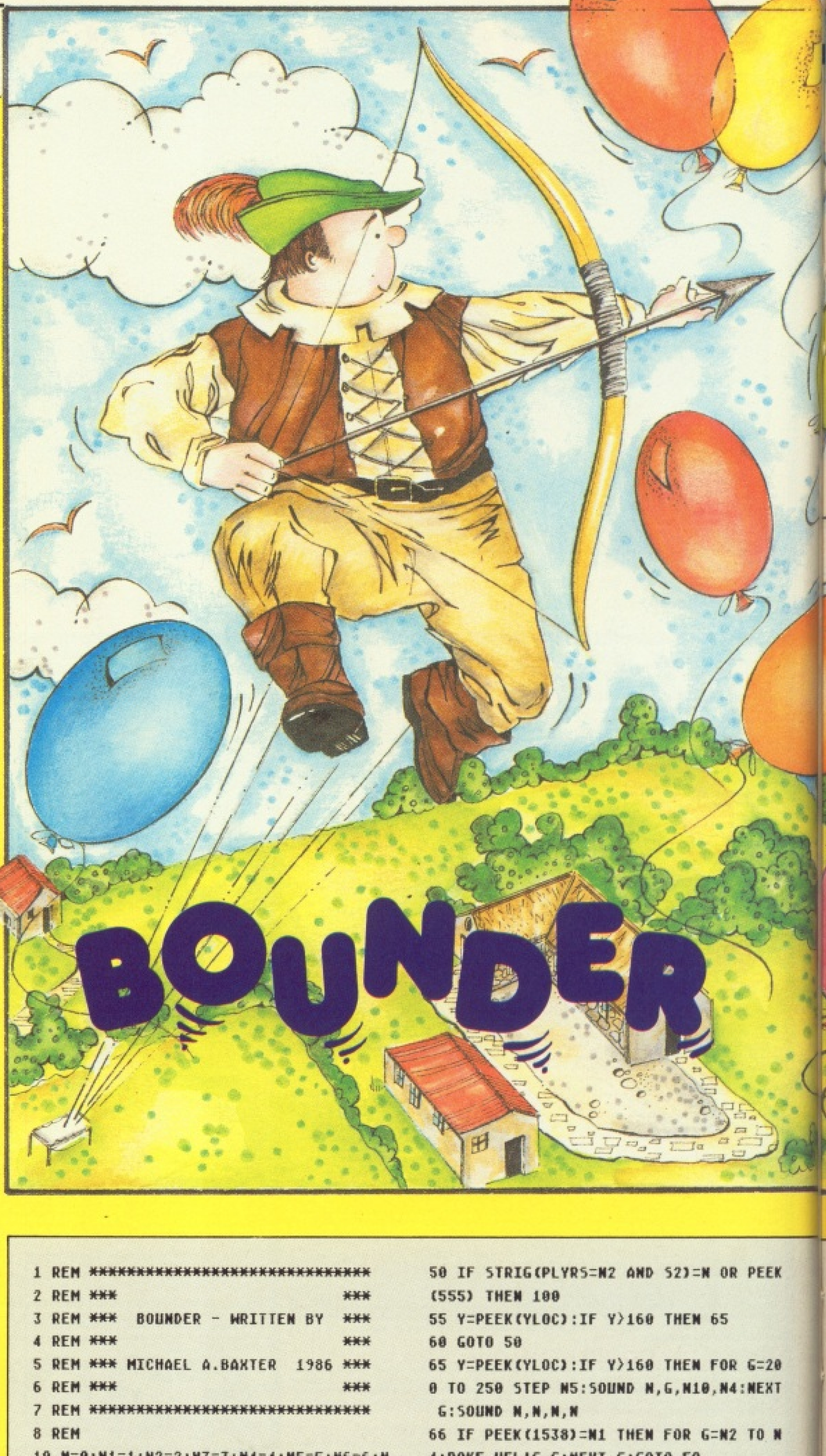
Address: ....

....

....

Postcode: ....

Do you already own a computer
If so, which one do you own? ....



By MICHAEL A. BAXTER

HAVE you ever thought of yourself as a bit of a William Tell? This challenging game gives you the chance to show everyone what a crack shot you are. You take the part of a slightly eccentric character who enjoys bouncing up and down on a trampoline while shooting at various objects with a crossbow.

Unfortunately for you, these objects happen to be obscured by an endless stream of indestructible balloons that drift up the screen, causing you endless trouble. Your timing is critical: You have only a limited number of crossbow bolts, so shoot carefully.

The game can be played by one or two players using joysticks plugged into ports one and two. The crossbow bolt is fired by pressing the fire button, and the speed of the man bouncing up and down can be altered by moving the joystick up and down. The game consists of three individual rounds:

ROUND 1: Has you bouncing up and down shooting at a standard archery target. The closer your bolts are to the bullseye, the more points are gained. This is the easiest round to play, and gives you practice for the harder ones that follow. The main problem is that the balloons keep getting in your way.

ROUND 2: You are attempting to shoot small glass jars off shelves and gain five points for each one that you manage to hit. But this is not as easy as it sounds, as those dratted balloons again obscure most of your vision.

ROUND 3: In this, the hardest level to master, the true archer comes out in all of you as you try to shoot apples off the heads of two men. If you shoot a man he dies and you only have one apple to shoot at. If you shoot both men then the game automatically ends, regardless of how many bolts you have left. And all the while those accursed balloons continue to stream up the screen annoying you. When you kill a man (and you most probably will) he vanishes and a tombstone appears with R.I.P carved upon it, just to remind you of your hideous crime.

Once you have typed the game, save it to tape or disc as it uses various machine code routines to manipulate graphics. Any errors in the code can lock the computer up and thus you would lose your program. All REM statements can be removed, and if you have any problems typing it in you can refer to the accompanying Get It Right! listing.

```
1 REM ******************************
2 REM ***                        ***
3 REM ***  BOUNDER - WRITTEN BY  ***
4 REM ***                        ***
5 REM *** MICHAEL A.BAXTER  1986 ***
6 REM ***                        ***
7 REM ******************************
8 REM
10 N=0:N1=1:N2=2:N3=3:N4=4:N5=5:N6=6:N
7=7:N8=8:N9=9:N10=10:VEL=1536:YLOC=204
:HL=256:PLYRS=N1:YMAX=1537
20 COM DART$(72),PCL$(43).VBIN$(14),VB
OFF$(N10),MOVE$(32),SC1(N6),HI$(N3),IN
IT$(N3),SC$(N3),B(N5),AP(N5)
22 VBIN$="h█/█h█\ \█♦":VBOFF$="h█b██\
L\█":INIT$="MAB":HI$="075"
30 POKE 559,N:GOSUB 5000:GOSUB 6000:GO
TO 1000
50 IF STRIG(PLYRS=N2 AND 52)=N OR PEEK
(555) THEN 100
55 Y=PEEK(YLOC):IF Y>160 THEN 65
60 GOTO 50
65 Y=PEEK(YLOC):IF Y>160 THEN FOR G=20
0 TO 250 STEP N5:SOUND N,G,N10,N4:NEXT
 G:SOUND N,N,N,N
66 IF PEEK(1538)=N1 THEN FOR G=N2 TO N
4:POKE VEL+G,G:NEXT G:GOTO 50
67 IF PEEK(1538)=N2 THEN FOR G=N1 TO N
3:POKE 1537+G,G:NEXT G:GOTO 50
70 GOTO 50
100 SOUND N,N,N8,N4:X=USR(ADR(DART$),N
PL):Y=PEEK(209):REM POKE 53251,50
101 IF X>90 THEN FOR G=100 TO N10 STEP
 -N5:SOUND N,G,N10,N10:NEXT G:SOUND N,
N,N,N:GOTO 105
103 ON ROUND GOSUB 120,150,180
```



VARIABLES

N-N10	Constants 0-10.
VEL	Determines the velocity of the bounce.
YLOC	Bounder's Y coordinate.
PLYRS	Number of players (1 or 2).
YMAX	Maximum height of bounce.
DART$	String holding Mcode for the dart.
PCL$	String holding Mcode for clearing the player missile area.
VBIN$	String holding VBI initialisation routine.
VBOFF$	String holding routine to turn VBI off.
MOVE$	String holding Mcode to move memory (used with character set).
HI$	String holding high score.
INIT$	High scorer's initials.
SC$	Current score.
SC1(nn)	Array holding score for both players.
B(nn)	Array holding status of glass jars.
AP(nn)	Array holding status of apples and condition of men.
YD	Reserve darts (indexed with screen Y coordinates to print darts).
MPL	Memory start for PLM stripe holding the dart.
Y	Coordinate of the dart.
ROUND	Round number (1,2 or 3).
DEAD	Flag. True if both men in armour have been shot.
G,A,L,I,HL	General variables used in the listing.

PROGRAM BREAKDOWN

10-30	Initialise variables and strings.
50-70	Main program control loop.
100 107	Dart moving routine.
110-112	Handles end of round routine, checks for two players.
120-125	Check for dart hitting target, alter score accordingly.
130-155	Check for dart hitting glass jars.
180-199	Check for dart hitting apples or men.
200-225	End of game and initial entry routine.
800-975	Draw screens.
1000-1120	Introduce options page.
5000-5500	Define characters and data.
6000-6130	Set up player missile graphics.
6150-6170	Install machine code to move dart.
6200-7080	Install VBI, DLI routines, and data.
7100-7109	Reset values before new game starts.

```
105 I=MPL+Y:FOR G=N TO N5:POKE I+G,N:N
EXT G:POKE 53278,N
106 YD=YD+N1:POSITION 35,YD:? " ":IF Y
D=21 OR DEAD THEN 110
107 GOTO 55
110 GOSUB 7108:IF  NOT S2 AND PLYRS=N2
 THEN S2=N3:DEAD=N:GOTO 112
111 S2=N:ROUND=ROUND+N1:IF ROUND=N4 TH
EN 199
112 GOSUB 800:X=USR(ADR(VBIN$)):YD=11:
GOTO 55
120 GOSUB 135:IF (Y>=65 AND Y<=88) OR
(Y>=145 AND Y<188) THEN SC1(ROUND+S2)=
SC1(ROUND+S2)+N2
121 IF (Y>=89 AND Y<=104) OR (Y>=129 A
ND Y<=144) THEN SC1(ROUND+S2)=SC1(ROUN
D+S2)+N3
122 IF (Y>=105 AND Y<=115) OR (Y>=118
AND Y<=128) THEN SC1(ROUND+S2)=SC1(ROU
ND+S2)+N5
123 IF Y=116 OR Y=117 THEN SC1(ROUND+S
2)=SC1(ROUND+S2)+N10
125 GOSUB 131:RETURN
130 POSITION N5,YB:? "\":FOR G=15 TO N
 STEP -N1:SOUND N,INT(RND(N)*10),N10,G
:NEXT G:SC1(ROUND+S2)=SC1(ROUND+S2)+N5
131 SC$=STR$(SC1(ROUND+S2)):POSITION 1
7-LEN(SC$)+INT(S2*2.7),ROUND-N1:? SC$:
RETURN
135 FOR G=15 TO N STEP -N1:SOUND N,200
,N8,G:NEXT G:FOR G=1 TO 60:NEXT G:RETU
RN
150 IF Y>=65 AND Y<=69 AND B(N1) THEN
YB=N5:B(N1)=N:GOTO 130
151 IF Y>=89 AND Y<=93 AND B(N2) THEN
YB=N8:B(N2)=N:GOTO 130
152 IF Y>=113 AND Y<=117 AND B(N3) THE
N YB=11:B(N3)=N:GOTO 130
153 IF Y>=137 AND Y<=141 AND B(N4) THE
N YB=14:B(N4)=N:GOTO 130
154 IF Y>=161 AND Y<=165 AND B(N5) THE
N YB=17:B(N5)=N:GOTO 130
155 GOSUB 135:RETURN
180 IF Y>=73 AND Y<=78 AND AP(N1) AND
AP(N3) THEN AP(N1)=( NOT (AP(N4))):AP(
N2)=AP(N4):YB=N6:GOTO 186
181 IF Y>=137 AND Y<=142 AND AP(N2) AN
D AP(N4) THEN AP(N2)=( NOT (AP(N3))):A
P(N1)=AP(N3):YB=14:GOTO 186
182 IF Y>=81 AND Y<=105 AND AP(N3) THE
N YB=N6:AP(N3)=N:AP(N1)=N:AP(N2)=AP(N4
):GOTO 195
```

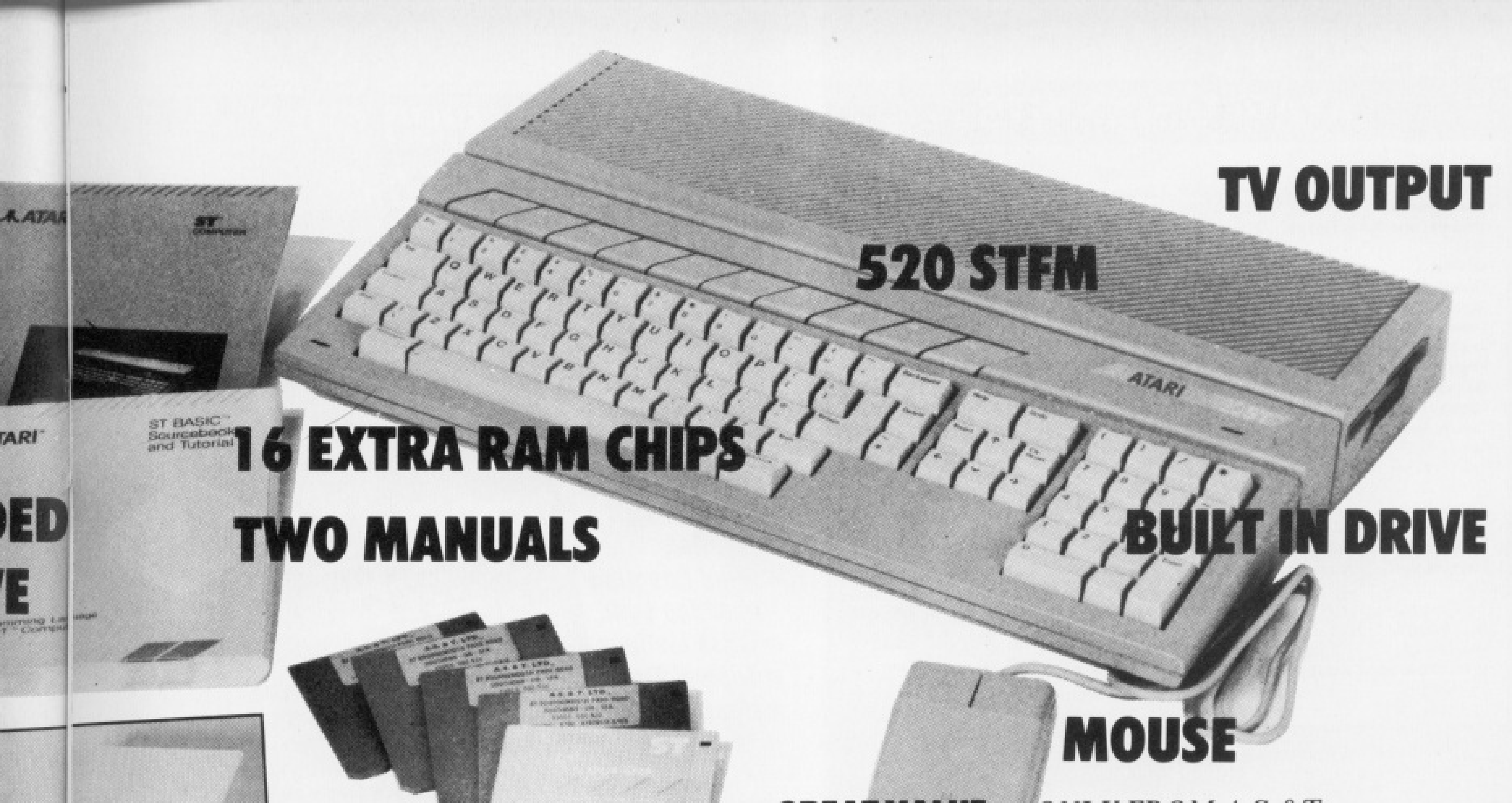
```
183 IF Y>=145 AND Y<=169 AND AP(N4) TH
EN YB=14:AP(N4)=N:AP(N2)=N:AP(N1)=AP(N
3):GOTO 195
185 GOSUB 135:RETURN
186 POSITION N4,YB:? "?":FOR G=200 TO
 N STEP -N10:SOUND N,G,N8,N8:NEXT G:SO
UND N,N,N,N
187 SC1(ROUND+S2)=SC1(ROUND+S2)+N6:GOS
UB 131
188 IF AP(N1) THEN POSITION N4,N6:? "?
?"
189 IF AP(N2) THEN POSITION N4,14:? "?
?"
190 IF (AP(N3) OR AP(N4)) THEN RETURN
191 GOTO 199
195 FOR G=15 TO N STEP -0.5:SOUND N,20
0+(15-(G*N2)),N10,G:NEXT G
196 FOR G=N TO N2:POSITION N4,YB+G:? "
  ":NEXT G:? "+++ ??":? "+++ ??"
197 GOTO 188
199 TRAP 200:IF PLYRS=N2 AND  NOT S2 A
ND YD=21 THEN DEAD=N1:RETURN
200 GOSUB 7107:POKE 707,N:POKE 708,N
201 FOR G=N TO N2:POSITION N,G:? "
                                    ";:
NEXT G:REM 39 SPACES
202 I=MPL+Y:FOR G=N TO N5:POKE I+G,N:N
EXT G:POKE 53278,N
205 POSITION 13,N:? "^GAME OVER]"
210 SC1=SC1(N1)+SC1(N2)+SC1(N3):SC2=SC
1(N4)+SC1(N5)+SC1(N6)
211 Z=VAL(HI$):IF SC1>Z AND SC1>SC2 TH
EN HI$=STR$(SC1):POSITION N8,N1:? "^PL
AYER ONE]";:GOTO 220
212 IF SC2>Z AND SC2>SC1 THEN HI$=STR$
(SC2):POSITION N8,N1:? "^PLAYER TWO]";
:GOTO 220
213 POKE 764,255:OPEN #N1,N4,N,"K":POS
ITION N,N2:? "      ^PRESS ANY KEY TO C
ONTINUE]":GET #N1,A:CLOSE #N1
214 FOR G=N TO N2:POSITION N,G:? "
                                    ";:N
EXT G:REM 39 SPACES
215 POKE 559,N:GOSUB 7100:GOTO 1000
220 ? " GREAT SCORE":? "ENTER INITIALS
    ^   ]"
222 OPEN #N1,N4,N,"K":POKE 764,255
223 FOR G=N1 TO N3
224 GET #1,A:IF A<65 OR A>90 THEN 224
225 INIT$(G,G)=CHR$(A):POSITION 19+G,N
2:? CHR$(A+128):NEXT G:CLOSE #N1:GOTO
213
799 REM   BASE  SCREEN
800 IF S2 THEN POSITION N1,N1:? " PLAY
ER ONE ":POSITION 27,N1:? "^PLAYER TWO
]";:GOTO 802
801 POSITION N1,N1:? "^PLAYER ONE]":PO
SITION 27,N1:? " PLAYER TWO ";
802 IF ROUND=N1 THEN POSITION 18,N:? "
^R1]";
803 IF ROUND=N2 THEN POSITION 17,N:? "
  R1  ":POSITION 18,N1:? "^R2]";
804 IF ROUND=N3 THEN POSITION 17,N1:?
"  R2  ":POSITION 18,N2:? "^R3]";
805 IF  NOT S2 THEN ? "++++++€+"
806 IF S2 THEN ? "+++++ ++++€+"
808 IF ROUND>N1 THEN FOR I=N1 TO N5:B(
I)=N1:AP(I)=N1:NEXT I
809 COLOR 32:FOR G=N3 TO 23:PLOT N,G:D
RAWTO 39,G:NEXT G
810 FOR G=N TO 38:POSITION G,22:? "-";
:POSITION G,23:? ".";:NEXT G
811 POSITION 12,22:? "???"
815 POSITION N,N3:FOR G=N1 TO N10:? "!
#!":? "#!#":NEXT G:POSITION N3,22:? ":
"
820 POSITION 22,21:? ";////////:":POSI
TION 21,22:? ">=+++++++++<?"
822 FOR G=12 TO 20 STEP N2:POSITION 35
,G:? "-●!":POSITION 35,G+N1:? "-●#":NE
XT G
823 POSITION 36,22:? "#!";
840 ON ROUND GOSUB 850,900,950
845 RETURN
849 REM  ROUND ONE SCREEN
850 RESTORE 860:FOR G=1 TO 13:READ A:P
OSITION N5,G+N4:? CHR$(A):NEXT G
855 POSITION N3,N7:? "+,":POSITION N3,
15:? "+,"
860 DATA 41,41,41,40,40,39,42,39,40,40
,41,41,41
865 RETURN
899 REM  ROUND TWO SCREEN
900 POSITION N,N5:FOR G=N TO N4:PRINT
"+++$$@$":? "+++%&":? :NEXT G
930 RETURN
949 REM  ROUND THREE SCREEN
950 FOR G=N TO N4:POSITION N4,N10-G:?
CHR$(G+128):POSITION N4,18-G:? CHR$(G+
128):NEXT G
955 FOR G=N5 TO N9:POSITION N5,N1+G:?
CHR$(G+128):POSITION N5,N9+G:? CHR$(G+
128):NEXT G
960 POSITION N3,19:? "#!#!]":? "+++!#!
#]":POSITION N6,18:? "?"
965 POSITION N3,11:? "#!#!]":? "+++!#!
#]":POSITION N6,N10:? "?"
970 POSITION N3,21:? "=":POSITION N3,1
3:? "=":POSITION N3,18:? ":":POSITION
N3,N10:? ":"
975 RETURN
999 END
1000 REM  OPTIONS PAGE
1010 ROUND=1:GOSUB 809:POSITION N2,N:?
 "^OPTION]+++^BEST  TODAY]+++^START]":
POSITION 16,N1:? "000":ROUND=N1
1020 POSITION 19-LEN(HI$),N1:? HI$:POS
ITION 20,N1:? INIT$
1030 POSITION N2,N2:? "PLAYERS+";PLYRS
;"+ + + + + + + + +PLAY  GAME":POKE 55
9,62
1040 A=PEEK(53279):IF A=N3 THEN GOSUB
1090:GOSUB 1080:GOTO 1030
1050 IF A=N6 THEN GOSUB 1090:GOTO 1100
1055 GOTO 1040
1080 IF PLYRS=N1 THEN PLYRS=N2:RETURN
1081 IF PLYRS=N2 THEN PLYRS=N1:RETURN
1090 FOR G=15 TO N STEP -N1:SOUND N,10
,10,G:NEXT G:SOUND N,N,N,N:RETURN
1100 FOR G=N TO N2:POSITION N,G:? "
                                    ";:
NEXT G:REM 39 SPACES
1101 POSITION N,N1:? " ^PLAYER ONE]  0
0  R2  00   PLAYER TWO":POSITION 15,N:
? "00  R1  00"
1102 POSITION 15,N2:? "00  R3  00":GOS
UB 800
1110 POKE YMAX,45:X=USR(ADR(VBIN$))
1120 GOTO 50
2000 X=USR(ADR(VBOFF$)):POKE 53251,70:
X=100
2001 FOR G=N TO 255:POKE PLM+1792+G,N:
NEXT G
2002 S=STICK(N)
2003 IF S=14 THEN POKE PLM+1792+X,N:X=
X-N1:POKE PLM+1792+X,255
2004 IF S=13 THEN POKE PLM+1792+X,N:X=
X+N1:POKE PLM+1792+X,255
2005 POSITION N1,N:? X-N1;"  ";:GOTO 2
002
4999 REM  REDEFINE CHARACTER SET
5000 R=PEEK(106)-N8:POKE 106,R:IF PEEK
(1791) THEN RETURN
5005 RESTORE 5010:FOR I=1 TO 32:READ A
:MOVE$(I)=CHR$(A):NEXT I
5010 DATA 104,104,133,204,104,133,203,
104,133,206,104,133,205,162,4,160,0,17
7,203,145,205,136,208,249,230,204,230
5020 DATA 206,202,208,240,96
5030 R=R-N8:SET=R:R=SET*HL
5040 Z=USR(ADR(MOVE$),57344,R)
5050 RESTORE 5100:TRAP 5070
5060 READ G:G=G*N8:FOR I=G TO G+N7:REA
D A:POKE SET*HL+I,A:NEXT I:GOTO 5060
5070 POKE 1791,SET:RETURN
5100 DATA 1,170,127,255,253,170,254,25
4,246,3,170,223,255,255,170,255,247,25
5
5102 DATA 4,0,0,0,0,0,85,17,85,5,0,0,1
,5,84,80,64,0,6,20,80,64,0,0,0,0,0
5104 DATA 7,154,154,154,154,154,154,15
4,154,8,159,159,159,159,159,159,159,15
9
5106 DATA 9,149,149,149,149,149,149,14
9,149,10,154,154,154,159,159,154,154,1
54
5108 DATA 11,64,112,64,85,85,64,112,64
,12,1,13,1,85,85,1,13,1
5110 DATA 13,0,0,0,0,0,2,34,14,170,1
70,170,170,170,170,170,170
5112 DATA 15,0,0,0,0,255,255,0,255,26,
0,0,0,0,0,192,240,252,27,0,0,0,0,0,3,1
5,63
5114 DATA 28,255,63,15,3,0,0,0,0,29,25
5,252,240,192,0,0,0,0,30,0,3,15,63,255
,252,252,255
5116 DATA 31,0,192,240,252,255,63,63,2
55,32,170,255,255,255,255,85,17,85
5118 DATA 59,0,0,60,255,255,255,170,17
0,60,0,12,207,232,255,85,17,85
5120 DATA 64,3,60,63,63,63,48,15,63,65
,243,204,63,63,63,63,63,60,66,204,51,5
1,60,207,240,255,255
```

```
5122 DATA 67,63,243,243,255,63,63,255,204,68,2,5,21,21,21,5,3,15,69,0,64,80,80,80,64,0,255
5124 DATA 70,255,51,51,255,252,192,240,252,71,252,252,252,3,243,3,252,252,72,60,204,240,240,240,192,192,0
5126 DATA 73,240,0,192,192,192,0,252,255,74,0,0,0,0,23,7,19,31,75,0,0,0,0,80,0,80,252
5128 DATA 76,255,251,255,250,255,250,255,255,77,63,255,240,243,240,243,243,255,78,255,255,51,51,243,51,51,255
5130 DATA 79,255,166,255,187,255,238,255,255,80,255,239,255,175,255,175,255,255,81,252,255,3,51,3,63,63,255
5140 DATA 33,0,60,102,102,126,102,102,0,46,0,124,102,102,102,102,102,0,48,0,124,102,102,108,96,96,0
5145 DATA 50,0,124,102,102,108,108,102,0,57,0,102,102,102,62,6,124,0,16,0,60,102,102,102,102,60,0
5147 DATA 61,128,192,224,224,224,224,192,128,62,1,3,7,7,7,7,3,1,94,16,48,126,254,254,126,48,16
5150 DATA 95,8,12,126,127,127,126,12,8,82,0,0,0,32,136,42,136,32,96,85,239,253,255,85,169,85,239
5155 DATA 84,170,127,253,255,170,2,170,255,*
5500 DATA *
5999 REM  SET UP PLAYER MISSILE GRAPHICS 
6000 PM=PEEK(106)-16:POKE 106,PM:GRAPHICS N:POKE 559,N:POKE 54279,PM:PLM=256*PM:POKE 756,PEEK(1791):POKE 752,N1
6010 RESTORE 6015:FOR I=1 TO 42:READ A:PCL$(I,I)=CHR$(A):NEXT I
6015 DATA 104,104;133,204,104.133,203
6020 DATA 104,133,206.104,133,205,166,206,160,0,169,0,145,203,136,208,251,230,204
6030 DATA 202,48,6,208,244,164,205,208,240,198,204,160,0,145,203,96
6040 Z=USR(ADR(PCL$),PLM,2048):MPL=PLM+1536
6050 POKE 53277,N3:POKE 53278,N:POKE 704,222:POKE 705,220
6100 ADDR=PLM+1024:HI=INT(ADDR/HL):LO=ADDR-HL*HI:POKE 205,LO:POKE 206,HI
6101 ADDR=PLM+1280:HI=INT(ADDR/HL):LO=ADDR-HL*HI:POKE 207,LO:POKE 208,HI
6110 FOR G=N TO N3:RESTORE 6120:FOR I=N TO 14:READ A:POKE PLM+1792+50+(43*G)+I,A:NEXT I:NEXT G
6120 DATA 60,126,126,255,255,255,255,255,126,126,60,24,16,16,8
6130 POKE 707,14:POKE 53251,100
6149 REM  MACHINE CODE TO MOVE DART 
6150 RESTORE 6160:FOR I=1 TO 72:READ A:DART$(I,I)=CHR$(A):NEXT I
6160 DATA 104,104,133,213,104,133,212,165,204,24,105,12,72,168,162,5,189,187,6,145,212,200,202,208,247
6165 DATA 169,150,133,209,198,209,240,27,165,209,141,2,208,173,6,208,208,17,173,15,208
6170 DATA 208,12,162,03,160,255,136,208,253,202,208,248,240,225,165,209,133,212,169,0,133,213,104,133,209,96
6198 REM  VERTICAL BLANK INTERRUPT 
6199 REM  AND DISPLAY LIST INTERRUPT 
6200 IF PEEK(1541)=165 THEN 7100
6210 RESTORE 7000:FOR I=1541 TO 1790:READ A:POKE I,A:NEXT I
6230 ADDR=PLM+1792+48:HI=INT(ADDR/HL):LO=ADDR-HL*HI:POKE 1643,LO:POKE 1644,HI:POKE 1650,LO:POKE 1651,HI
6233 POKE 1659,LO:POKE 1660,HI
6234 ADDR=PLM+1792+49:HI=INT(ADDR/HL):LO=ADDR-HL*HI:POKE 1647,LO:POKE 1648,HI
7000 DATA 165,204,166,203,240,16,24,109,0,6,133,204,201,170,144
7002 DATA 21,169,0,133,203,240,15,56,237,0,6,133,204,205,1,6,176,4,169,127
7004 DATA 133,203,162,43,164,204,189,128,6,145,205,200,202,208,247,162,13,165,204,24
7006 DATA 105,9,168,189,172,6,145,207,200,202,208,247,165,204,201,50,176,8,174,2
7008 DATA 6,142,0,6,208,18,201,55,176,8,174,3,6,142,0,6,208,6,174,4
7010 DATA 6.142,0,6,160,0,173,254,255,72,185,255,255,153,254,255,200,192,170,208
7012 DATA 245,104,153,254,255,76,98,228,0,0,0,0,0,24,28,238,247,55,119,110
7014 DATA 238,238,220,220,110,110,118,1,255,127,113,127,255,229,27,227,28,255,255,127
7016 DATA 60,28,62,124,90,134,126,60,0,0,0,0,0,0,0,0,0,66,3,193
7018 DATA 3,2,0,0,0,0,0,0,2,5,254,5,2
7075 DATA 16,16,80,66,0,0,0,2,0,2,160,48,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,4,65,172,6
7080 DATA 72,169,0,141,10,212,141,26,208,169,52,141,24,208,169,255,141,22,208,169,220,141,23,208,104,64
7099 REM  RESET VALUES BEFORE NEW GAME
7100 POKE VEL,N3:POKE 203,N:POKE YLOC,160:POKE 53248,150:POKE 53249,146:POKE 53257,N1:POKE 623,N4:POKE 711,N6
7101 POKE 1733,PEEK(88):POKE 1734,PEEK(89):FOR G=1 TO 3:POKE 1537+G,G:SC1(G)=N:SC1(G+N3)=N:NEXT G:POKE YMAX,160
7105 POKE 560,193:POKE 561,6:POKE 712,122:POKE 709,14:POKE 710,116:POKE 706,31:I=INT(RND(N)*16):POKE 707,I*16+N8
7106 POKE 512,229:POKE 513,6:POKE 54286,192:POKE 82,N:YD=11:FOR I=N1 TO N5:B(I)=N1:AP(I)=N1:NEXT I:S2=N:DEAD=N
7107 X=USR(ADR(VBIN$)):FOR G=1 TO 10:NEXT G
7108 Z=PEEK(YLOC):IF Z>=155 THEN X=USR(ADR(VBOFF$)):RETURN
7109 GOTO 7108
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
1	4651	2	3931	3	6067
4	3931	5	6065	6	3931
7	4651	8	871	10	18254
20	17095	22	15119	30	7588
50	9265	55	5704	60	1424
65	17055	66	12329	67	11988
70	1424	100	12655	101	16066
103	4589	105	10006	106	9963
107	1439	110	11747	111	8093
112	8058	120	16218	121	14307
122	14387	123	10350	125	3418
130	21105	131	14745	135	14172
150	9702	151	9732	152	10554
153	10604	154	10613	155	3438
180	16973	181	17591	182	14879
183	15110	185	3438	186	16638
187	7469	188	6956	189	6834
190	6256	191	1671	195	10376
196	12581	197	1664	199	12366
200	6002	201	13747	202	10006
205	9199	210	9666	211	21669
212	19317	213	28399	214	13749
215	5650	220	9306	222	5259
223	2585	224	5931	225	13944
799	9555	800	20428	801	16296
802	8218	803	13101	804	13579
805	3974	806	3666	808	10397
809	9876	810	11299	811	5417
815	12891	820	9675	822	13088
823	3675	840	4647	845	1498
849	10981	850	12617	855	7693
860	6620	865	1498	899	11082
900	11096	930	1498	949	12665
950	15314	955	15313	960	9576

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
965	9734	970	15386	975	1498
999	836	1000	8676	1010	28947
1020	9759	1030	12630	1040	10330
1050	5857	1055	1864	1080	6897
1081	6898	1090	12328	1100	13749
1101	19017	1102	6887	1110	6075
1120	1424	2000	7106	2001	7425
2002	2156	2003	10507	2004	10502
2005	6424	4999	13687	5000	9585
5005	10632	5010	16129	5020	3733
5030	4271	5040	4984	5050	4086
5060	13573	5070	4249	5100	11011
5102	9963	5104	11125	5106	11320
5108	8490	5110	8999	5112	11196
5114	12442	5116	10190	5118	9657
5120	13771	5122	12931	5124	15067
5126	11947	5128	15969	5130	15543
5140	14070	5145	13542	5147	13638
5150	13835	5155	6118	5500	1140
5999	19043	6000	19595	6010	10571
6015	4930	6020	11386	6030	9414
6040	7492	6050	9125	6100	12770
6101	12792	6110	16617	6120	8729
6130	4486	6149	16008	6150	11111
6160	14441	6165	12311	6170	15509
6198	16945	6199	16832	6200	4526
6210	10004	6230	18537	6233	4652
6234	13734	7000	8848	7002	10545
7004	11986	7006	11450	7008	9418
7010	11428	7012	10620	7014	12106
7016	8733	7018	4839	7075	12716
7080	14723	7099	17537	7100	19061
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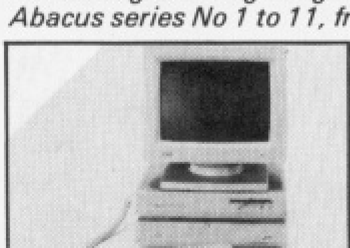
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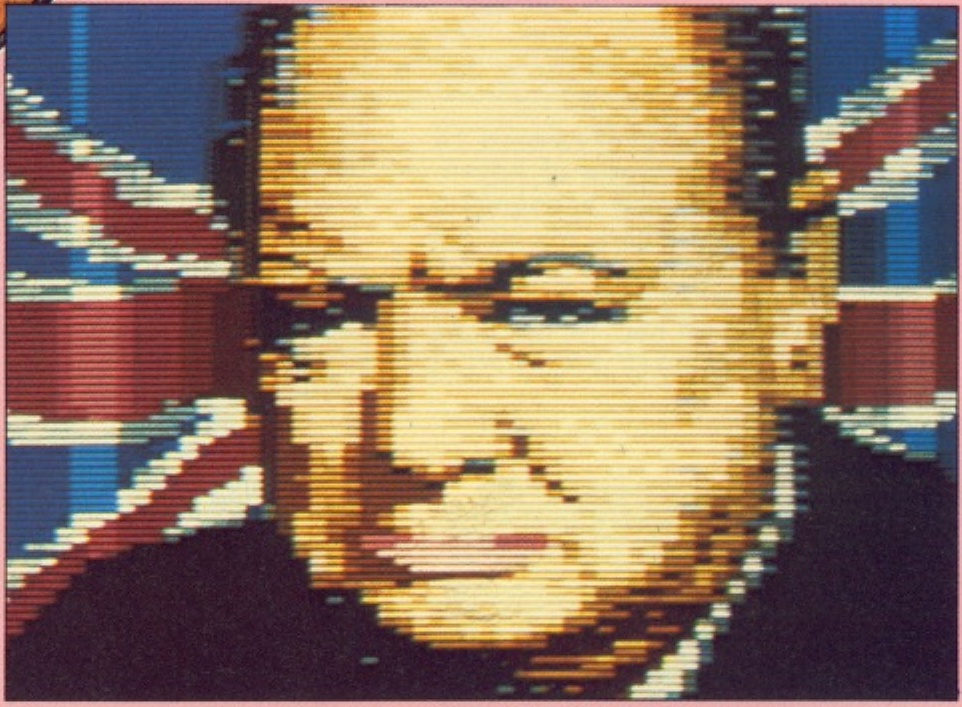
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ATARI USER Palette

LOTS of superb pictures created on Atari computers have started to arrive in our mailbag. To let everyone share the delights of these works of art we are publishing a few each month. We start with a collection from Radical Systems (Bob Chewter).

If you would like to see your masterpieces in print, send them to: Palette, *Atari User,* Europa House, 68 Chester Road, Hazel Grove, Stockport, SK7 5NY.



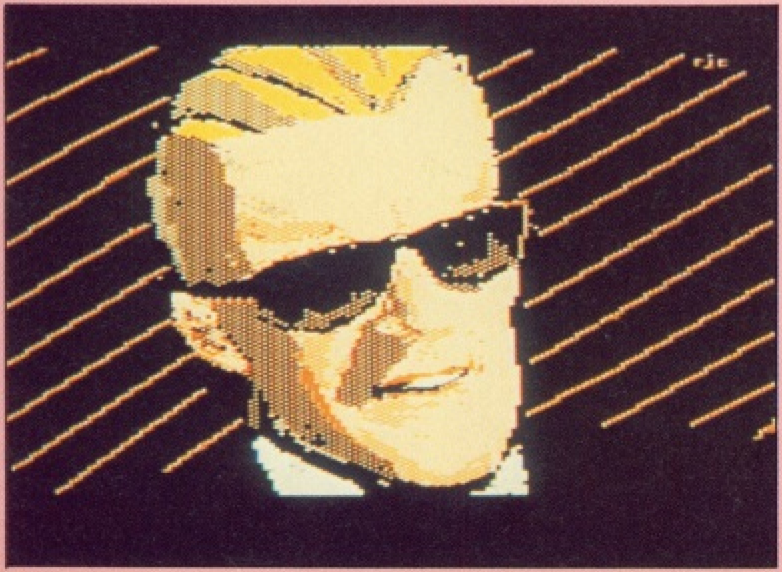
Our Winnie



Canine capers



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M-M-M-Max



Self portrait

Ranging far in magic lands

by Ruoloc

WELCOME heroes everywhere to another visit to the world of Adventure. First of all I must announce a change of party members. My old pal Brillig has decided that the lure of the new ST has proven too much of a temptation even for him. He has gone off to concentrate on that for *Atari St User*.

As for me: Well, having just defeated the evil Krill and seen off the Demon Jeearr on behalf of the Great Belboz, and his Circle of Enchanters, I find myself at somewhat of a loose end. It seems that my prowess has preceded me and all known adversaries have fled, so my Wizard/Ranger skills are not needed at this time.

On occasions such as this, when I am resting, I often turn to my trusty Atari and indulge in a spot of computer adventuring. In fact, having solved countless quests in my time I suppose you could look on me as something of an expert, and if modesty permits, I could pass on some valuable help to any of you who might be in a spot of difficulty.

Brillig has kindly passed on his postbag to me, and as of this month I shall be delving into it to see who is in trouble.

The Pawn, (ah, Kerovnia, when again shall I look upon your beauty) is the subject of the month, and to support it I shall give you many hints to the solution in a cryptic form only, for those of you who might not want the secrets divulged completely.

You may have read last month of the imminent release of Guild of Thieves: Well, the final touches are being put to the game as we speak, but also on the drawing board at Magnetic Scrolls are five more adventures to be released over the next two years, so hurry up and solve Guild before you're faced with a backlog.

On that note, I feel a competition is in order, so the first person to send me the list of all the treasures needed in Guild (and remember, I have seen it already so I know the answer) will win a prize.

See you next month

Clues to The Pawn

Game objectives:

- Get the wristband removed
- Kill the adventurer
- Rescue the princess
- Kill Kronos
- Vote for Gringo

The note: Kronos has offered you the note.... now what, take it or not? If you refuse he'll not be very happy. If you take it, you'll need to find a king.

The shed: Where do you leave your keys?

In the shed: The plant needs to be planted a bit better; look at the bench more closely.

The guru: Could you cover the band maybe? He needs a drink. Maybe a climb will find liquid, but you'll need something to put it in.

The boulders: Big aren't they? One object couldn't possibly move them by itself, but two together . . . mmm.

The snowman: He won't talk, but maybe he'll warm to you, in a colourful way.

To kill the adventurer: Ask Kronos about the band.

The lava river: Try moving the pedestal. Breaking a wall could do more than just damage.

Maze: Exit maze?

Vote for Gringo: Ballot paper I think. In the safe I think.

The double doors: Be very polite. The porter may be thirsty.. so is Lewis.

Kill Kronos: The bottle needs to smash. Feeling strong?

The dragon: He is a bit blind. Point out some other people in the shadows. Wearing Kronos' clothes. Whatever next?

The platform: The cream door could be knocked down.

Open the palace: The key is feeling Blue.





DOES anyone out there have any answers for Donna Thresher, who is stuck in Ten Little Indians? She can't get out of the carriage.

Adam Marshall would like a map of Alternate Reality, and thanks to reader Vic Rowland, I shall provide you with one next issue.

John Sweeney is not happy about Brillig's review of Moonmist and writes that although he said it is specifically aimed at adult gamers new to adventures, and on this basis he judged it to be in some part a failure, it does say on the box that it is for ages 9 and up.

It is in fact a superb game for 9-year-olds, as Infocom's previous two introductory level games were actually much too hard for the average youngster.

Also, to answer John's plea about Ulysses and the Golden Fleece: to get past Pluto, throw DUST which you can find in a hole in a tree on the Island of Storms.

Thanks for your letter John, and with regard to Moonmist, I entirely agree with you and the idea of four different endings is truly wonderous.

Adventures Unlimited are four boys from Manchester who between them have solved over 60 quests, and offer help if you write to them at Adventurers Unlimited c/o Stewart Townsend, 1 Taunton Ave, Flixton, Manchester M31 1PQ.

Mrs Greenway has shattered nerve endings and a nearly exploding brain, due to the Pay Off. For 10 months she has been in the Box Room unable to get the box containing the gem. The April issue of *Atari User* carried a complete solution for you, but if you missed it, get the list from the chamber and drill box (the number is on the list) open box and get gem.

The answer comes from Chris Beard who says that J C Bradbury asks where to find the combination in Lapis Philosophorum. You need to clean up the sheet of copper using the rags from the monastery, then use the copper to reflect some hieroglyphics on a boulder in a swamp. Also, to enter the cave just type enter cave, then play hangman with the Troll.

Lastly, I have received a letter from Robert O'Leary, the boss of Robico Software, who is puzzled as to why a mention of his Rick Hanson Adventure has not been forthcoming in the column. He puts it down to the fact that I haven't got a copy so he kindly sent one with this letter.

So to Robert I say Robico and Rick Hanson, there I've said them twice now, thanks for the disc, and I'll have a look at it for next month.

Good luck with The Pawn, I'm off to sharpen my trusty sword and practice a few spells. See you next month. ■

HINTS AND TIPS

By Nik Kiokpasoglou, Greece

● *Escape from Traam, by Jyym Pearson:* If you have found the alien warrior, type TALK: The program will respond with some letters. Type TALK again: The program will respond again, with different letters. The letters are words, but they are written in code. The coded words are:
TFRBY AW HXW YCOV SBV VFCD RH XWFW UORAT HXW YCOVWB HFWW SBV KSHUX ZCF HXW HFSSAG.....
I broke the code, and the final code was:
BRING ME THE GOLD AND DROP IT HERE.CLIMB THE GOLDEN TREE AND WATCH FOR THE TRAMMS...THEY EAT EARTHLINGS.

● *Dallas Quest.* The complete responses are:
East, get envelope, north, get sunglasses, north, offer sunglasses, enter barn, drop owl, get shovel, south, south, south, south, west, get bugle, west, dig, dig, blow bugle, dig, read tombstone.

Then: East, north, open desk, get pouch, close desk, drop money, north, north, west, west, north, examine airplane, offer envelope, get knapsack, open knapsack, drop knapsack, get parachute, close knapsack, jump, open pouch, offer pouch, close pouch, drop parachute, south, south, south.

Now: Tickle anaconda, south, south, enter dinghy, open pouch, offer pouch, close pouch, row dinghy, blow bugle, drop bugle, drop shovel, enter post, draw curtain, get flashlight, get mirror, open pouch, offer pouch, close pouch, drop photo, drop mirror, drop ring, drop pouch, light flashlight, climb ladder, drop flashlight, east.

Then: Enter post, get ring, climb ladder, drop ring, east, enter post, get photo, climb ladder, drop photo, east, enter post, get pouch, climb ladder, drop pouch, east, enter post, get mirror.

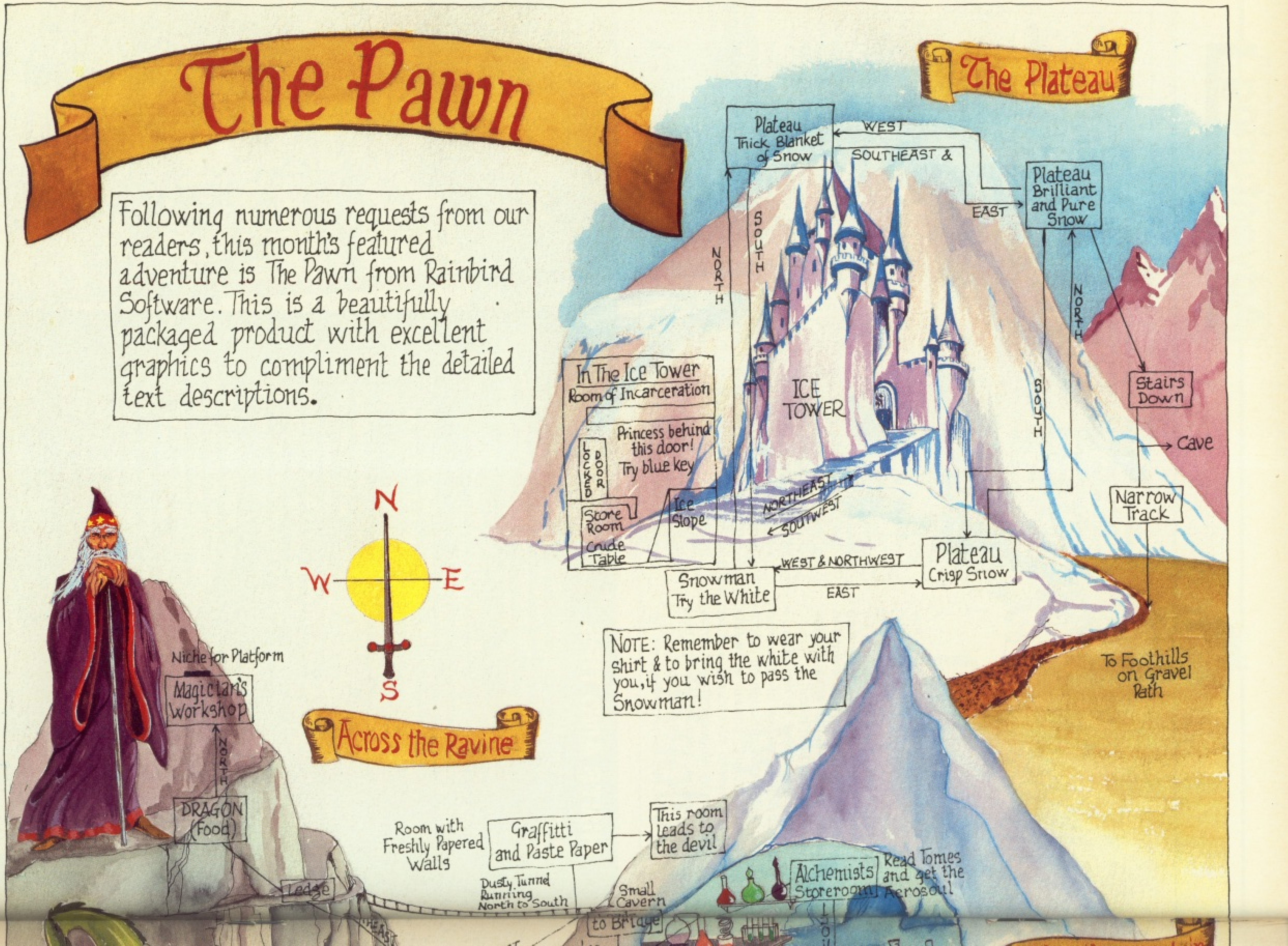
And finally: Climb ladder, get ring, get photo, get pouch, get flashlight, west, extinguish flashlight, show photo, get coconuts, west, open pouch, offer pouch, give eggs, offer mirror, wave ring, heat eggs, light flashlight, drop ring, get map.

J.R will appear and make an offer to you.You don't want to accept it, so type NO. You will go back to Southfork Ranch. Type GIVE MAP and the game ends with 112 moves.



The Pawn

Following numerous requests from our readers, this month's featured adventure is The Pawn from Rainbird Software. This is a beautifully packaged product with excellent graphics to compliment the detailed text descriptions.




Under the Mountain
To the Maze
DANGER!
Cubic Stone Pedestal (Search well)
Lava River
Do not cross until you have climbed the shaft
Vertical Shaft
See below
Long & Winding East/west Corridor
SOUTH ONLY
The Cream Door
Small Cave
NORTH
Corridor with clear glass windows
Strange Room Look out for listings & notes. Read them!
Laboratory
Leads to Bridge
Ledge
Small Cavern
Running North to South
NORTHEAST
Rope Bridge
Southern Ledge and Laboratory
Halfway up Northern Mountain
SOUTHEAST
WARNING The dragon will eat you
Try: Show Dragon food by Shining White
1
Cave Mouth
Dim Cavern with pool & bats
Fascinating Cavern
Up to...
2
Wall holding back river
Up to...
Large Cavern
ATARI USER
In the tree
Trunk Room
Spiral Staircase
Low Ceiling Room
White Room
Office Desk, Rug & Safe
Two Ballot Boxes
Voting Booth Room
Small Undergound Abode
Lift
To Mine and Lead

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THE bucolic island of Sark – population 500 and not a car to be seen – is, surprisingly, a major user of information technology.

"Sark is a thriving financial centre due to its tax-free status, so electronic communications are a vital element here", explains MicroLink subscriber Philip Stokes who has lived on the island for 13 years. "In fact I reckon we have the world's highest ratio of telex and fax machines per head of population".

Philip owns a gift shop, but he used to work on the London Stock Exchange and when he isn't serving tourists he operates an administration service for offshore companies.

"Efficient movement of documents is essential to properly maintain an offshore company's Sark registration", says Philip. "But while the ferries carrying our mail run like a bus service in the summer, rough winter weather can easily cut us off for days at a time.

"The Guernsey authorities are about to provide an electronic mailbox facility which will help make up for our lack of PSS, and I'm confident my investment in computer communications will have paid for itself within a year thanks to MicroLink".

Help for the handicapped

A CALL for computer users to put their brains to work on behalf of the handicapped has come from MicroLink subscriber Brian Vallot-Lewis.

Brian is disabled by a rare disease called Friedreich's Ataxia which affects a victim's coordination, balance and speech.

He says:"I'm extremely lucky in that I'm still just about mobile, but others are not. Many sufferers are completely untechnical, but some of us can see huge possible benefits from the use of a micro.

"I am currently working on a dictionary word entry system, the main advantage of which would be greatly reduced use of the keyboard in word processing and programming.

"This is only one example of the kind of thing we need. Help with software ideas, complete programs, or just tips and advice could open one of the prison doors for someone confined to a wheelchair".

Your chance to join MicroLink see Page 4

Discounts on view

THE latest firm to display its wares in MicroLink's Shop Window section is run by Paul Lange, descendant of a Lithuanian family which emigrated to Britain at the turn of the century.

Paul has been exporting computer software and peripherals to home and business users overseas for the past two years. His customers range from Europe and North America to Australia, Israel and North Africa.

Recently he decided to extend Veyair's discount offers to UK residents, and chose Shop Window on MicroLink to display his products.

LINK TO CUT COSTS

TO combat the effects of the crippling disease which afflicts more than 15 million people worldwide, the Leprosy Mission helps support more than 2,500 doctors, nurses and paramedics caring for 400,000 lepers in 30 countries.

The interdenominational Christian organisation has 16 area organisers throughout England and Wales who are being connected by MicroLink electronic mail in a pilot scheme designed to speed the flow of information while cutting the cost of communications.

"We hope to make savings in our overheads that will allow us to send more money abroad to help leprosy victims", said Dr Tony Lloyd, the man in charge of the project.

"To produce and circulate a memo to our area offices in the UK can cost as much as £25 – by MicroLink Email we should be able to do the job for under £2".

From the Antarctic with love . . .

ELECTRONICS technician John Mackintosh couldn't work much farther away from home than on a scientific research vessel in the icy waters of Antarctica. But he is in constant touch with his wife in Scotland thanks to a combination of MicroLink and Inmarsat, the international marine satellite system.

Contracted to an international scientific foundation, John's ship travels all over the world doing ocean research.

For some time it has been using electronic mail as a relatively cheap alternative to regular telex services for communicating with its base office.

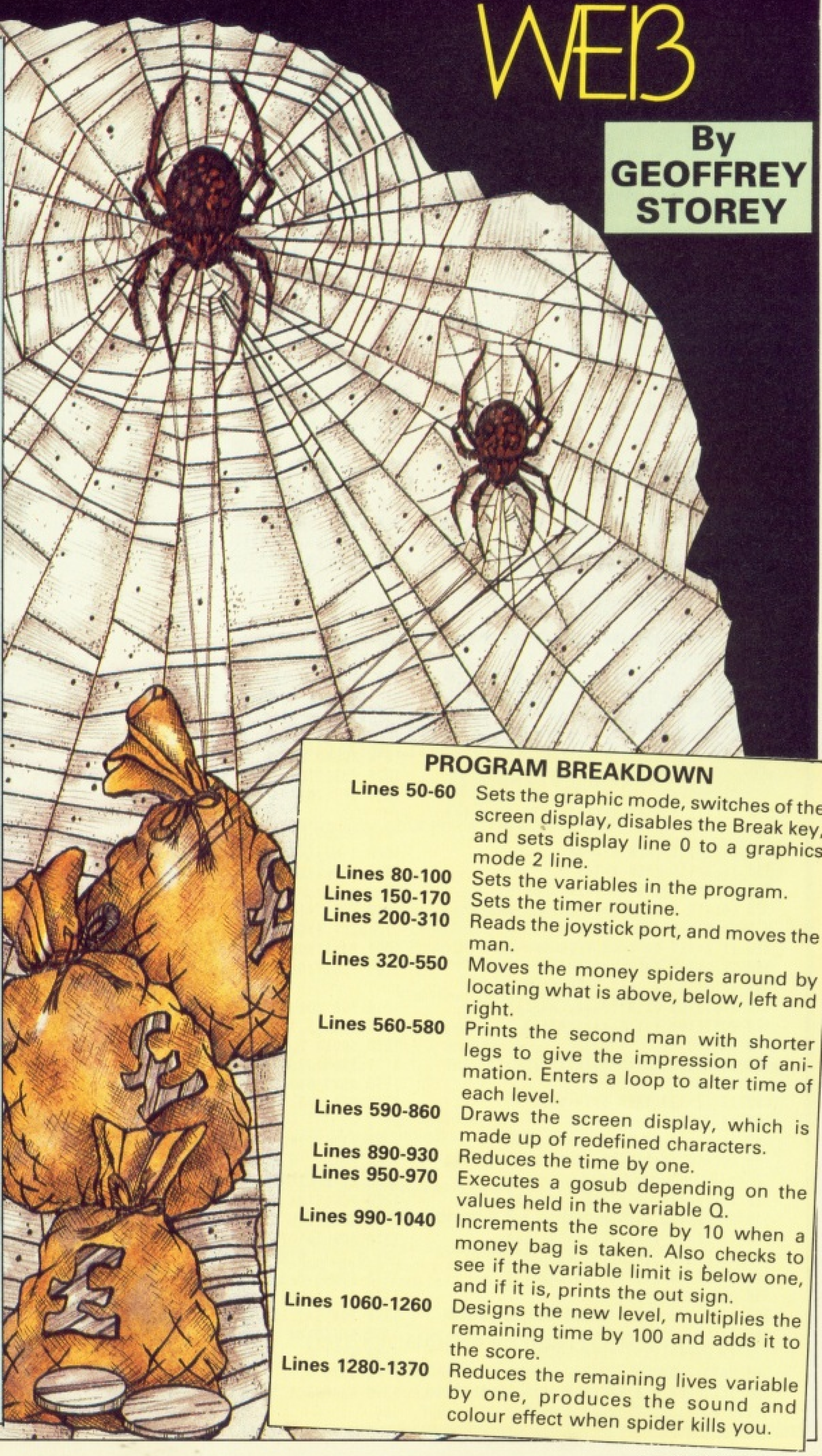
"So when I was looking for a means of keeping in touch with home while at sea, the obvious solution was Email", said John.

"Inmarsat is an extremely reliable means of communications – though it's expensive at about £5 a minute. By using a MicroLink mailbox, however, my wife and I can exchange letters in a fraction of the time taken by voice calls and make considerable savings.

"Because MicroLink is available 24 hours a day, I don't have to set up any particular schedule with my wife, and I can use the ship's communications system whenever it is available".

WEAVING A TANGLED WEB

By GEOFFREY STOREY



MONEY, and lots and lots of it, is scattered around a two dimensional dungeon with 10 levels. All you have to do in this game is walk up and take it.

Sounds easy. But living in this dungeon are two eight-legged, furry money spiders. And these horrible little creatures get very annoyed when you try to take their savings.

Luckily for you they are not very intelligent, and you can avoid them by confusing them at junctions. This can be done by watching which way they travel when they encounter a gap in the walls and moving in the opposite direction.

You have to travel from the top of the screen to the bottom collecting the moneybags. When you have enough, an out sign will appear in the top left hand corner and at this point you make your way to the exit avoiding the spiders on the way up. If this sounds too easy, a blue bar at the top of the screen indicates a time limit which is running out fairly quickly.

Moneybags is a one player game, played with the joystick in port one. During the game a few moneybags may still be left when the out sign appears and these can be collected to obtain extra points. Each moneybag is worth 10 points and at the end of each level you gain a bonus for completing the screen. You have three lives at the start of the game and if you lose a life you'll begin that particular level again.

There are 10 levels, each a little harder than the previous, with level 10 as the most challenging – where the walls and doorways of the room are invisible. The screen layout is randomly generated, so each level and game will be different.

The computer keeps your high score only while the program is running. Pressing system reset will purge the variables containing this information, so you only have the score table as a temporary challenge.

When first run, the initialisation will take around 10 seconds due to the characters being redefined and the setting up of a machine code routine that animates the spider's legs. The Break key is disabled by the two pokes in lines 50 and 1390 because there are interrupt routines running which continue to execute even after it has been pressed. To abort the game press the System Reset key.

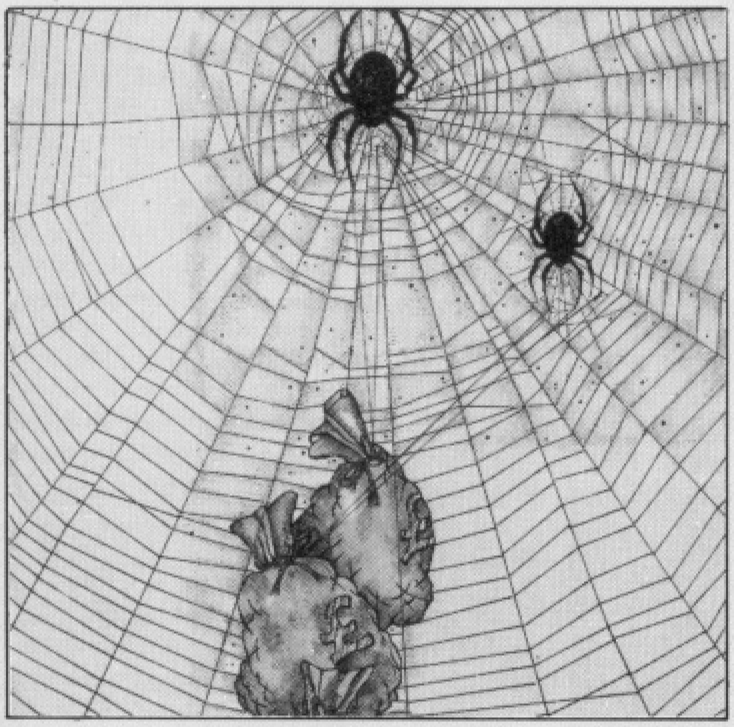
PROGRAM BREAKDOWN

Lines 50-60	Sets the graphic mode, switches of the screen display, disables the Break key, and sets display line 0 to a graphics mode 2 line.
Lines 80-100	Sets the variables in the program.
Lines 150-170	Sets the timer routine.
Lines 200-310	Reads the joystick port, and moves the man.
Lines 320-550	Moves the money spiders around by locating what is above, below, left and right.
Lines 560-580	Prints the second man with shorter legs to give the impression of animation. Enters a loop to alter time of each level.
Lines 590-860	Draws the screen display, which is made up of redefined characters.
Lines 890-930	Reduces the time by one.
Lines 950-970	Executes a gosub depending on the values held in the variable Q.
Lines 990-1040	Increments the score by 10 when a money bag is taken. Also checks to see if the variable limit is below one, and if it is, prints the out sign.
Lines 1060-1260	Designs the new level, multiplies the remaining time by 100 and adds it to the score.
Lines 1280-1370	Reduces the remaining lives variable by one, produces the sound and colour effect when spider kills you.

Game

```
10 REM MONEY BAGS
20 REM BY GEOFFREY STOREY
30 REM (c) ATARI USER.
40 REM
50 GRAPHICS 17:POKE 559,0:POKE 16,64:P
OKE 53774,64
60 DL=PEEK(560)+PEEK(561)*256:POKE DL+
3,71
70 GOSUB 1580
80 TIME=18:OT=TIME:LEVEL=1:DIF=3:SCORE
=0:LIFE=3
90 H=1:V=3:OH=H:OV=V:X=18:Y=21:OX=X:OY
=Y:DX=1:DY=1
100 XX=1:YY=21:OXX=XX:OYY=YY:DXX=-1:DY
Y=1:A=32:B=A
110 GOSUB 600
120 POKE 559,34
130 FOR I=1 TO 100:NEXT I
150 COLOR 10:PLOT 3,1
160 FOR I=3 TO OT:DRAWTO I,1:SOUND 0,2
00-I*3,10,10
170 NEXT I:SOUND 0,0,0,0
180 IF LEVEL=10 THEN FOR I=8 TO 0 STEP
 -0.1:FOR M=1 TO 5:NEXT M:SETCOLOR 3,1
5,I:NEXT I:SETCOLOR 3,0,0
190 POKE 19,0
210 S=STICK(0):IF S<>15 THEN SOUND 0,0
,0,0
220 IF S=7 THEN LOCATE H+1,V,Q:IF Q<>1
31 THEN H=H+1
230 IF S=11 THEN LOCATE H-1,V,Q:IF Q<>
131 THEN H=H-1
240 IF S=13 THEN LOCATE H,V+1,Q:IF Q<>
131 THEN V=V+1
250 IF S=14 THEN LOCATE H,V-1,Q:IF Q<>
131 THEN V=V-1
260 LOCATE H,V,Q:IF Q=165 OR Q=4 OR Q=
40 THEN GOSUB 950
270 IF S=15 THEN 300
280 SOUND 0,100,1,8
290 POSITION OH,OV:? #6;CHR$(32)
300 POSITION H,V:? #6;CHR$(33)
310 OH=H:OV=V
330 LOCATE X,Y+DY,Z:IF Z<>131 THEN Y=Y
+DY
340 IF Z=131 THEN DY=-DY
350 IF Z=165 THEN A=165
360 IF Z=33 OR Z=41 THEN 1280
370 LOCATE X+DX,Y,Z:IF Z<>131 AND Z<>4
0 THEN X=X+DX
380 IF Z=131 OR Z=40 THEN DX=-DX
390 IF Z=165 THEN A=165
400 IF Z=33 OR Z=41 THEN 1280
410 POSITION OX,OY:? #6;CHR$(A):A=32
420 POSITION X,Y:? #6;CHR$(4)
430 OX=X:OY=Y
450 LOCATE XX,YY+DYY,ZZ:IF ZZ<>131 THE
N YY=YY+DYY
460 IF ZZ=131 THEN DYY=-DYY
470 IF ZZ=165 THEN B=165
480 IF ZZ=33 OR ZZ=41 THEN 1280
490 LOCATE XX+DXX,YY,ZZ:IF ZZ<>131 AND
 ZZ<>40 THEN XX=XX+DXX
500 IF ZZ=131 OR ZZ=40 THEN DXX=-DXX
510 IF ZZ=165 THEN B=165
520 IF ZZ=33 OR ZZ=41 THEN 1280
530 POSITION OXX,OYY:? #6;CHR$(B):B=32
540 POSITION XX,YY:? #6;CHR$(4)
550 OXX=XX:OYY=YY
560 IF S<>15 THEN POSITION H,V:? #6;CH
R$(41)
570 IF PEEK(19)>1 THEN GOSUB 890
580 GOTO 210
600 SETCOLOR 0,8,8:SETCOLOR 1,12,8:SET
COLOR 2,14,12:SETCOLOR 3,15,8
610 IF R=0 THEN R=1:POSITION 2,0:? #6;
CHR$(4);" MONEY  BAGS ";CHR$(4):POKE 5
59,34:GOTO 1500
620 ? #6;CHR$(125):POKE 559,0
630 POSITION 0,0:? #6;"SCORE:";SCORE;
640 POSITION 15,0:? #6;"MEN:";LIFE;
650 POSITION 1,1:? #6;"&"
660 POSITION 7,23:? #6;"+,-."
670 COLOR 131:FOR I=0 TO 19
680 FOR M=2 TO 22 STEP 2
690 PLOT I,M
700 NEXT M:NEXT I
710 FOR I=1 TO 22
720 PLOT 0,I
730 PLOT 19,I
740 NEXT I
750 FOR I=4 TO 20 STEP 2
760 M=INT(RND(0)*18)+1
770 COLOR 0:PLOT M,I
780 NEXT I
790 LIMIT=0
800 FOR M=1 TO DIF
810 FOR I=3 TO 19 STEP 2
820 COLOR 165
830 CX=INT(RND(0)*18)+1
840 LOCATE CX,I,LO:IF LO<>165 THEN LIM
IT=LIMIT+1
850 PLOT CX,I
860 NEXT I:NEXT M
870 RETURN
890 COLOR 0
900 PLOT OT,1
910 OT=OT-1
920 IF OT<3 THEN 1280
930 POKE 19,0:RETURN
950 IF Q=165 THEN 990
960 IF Q=4 THEN 1280
970 IF Q=40 THEN GOTO 1060
990 SCORE=SCORE+10:POKE 77,0
1000 LIMIT=LIMIT-1
1010 SOUND 0,120,14,10
1020 POSITION 0,0:? #6;"SCORE:";SCORE;
1030 IF LIMIT<1 THEN POSITION 0,3:? #6
;"("
1040 SOUND 0,0,0,0:RETURN
1060 ? #6;CHR$(125):SOUND 0,0,0,0
1070 LEVEL=LEVEL+1:IF LEVEL=11 THEN 13
90
1080 FOR I=10 TO 50:SOUND 0,100-I*2,10
,10:NEXT I:SOUND 0,0,0,0
1090 POSITION 5,6:? #6;"LEVEL=";LEVEL;
1200 POSITION 5,8:? #6;"BONUS=";OT*100
;
1210 FOR BONUS=1 TO OT:SCORE=SCORE+100
:POSITION 5,10:? #6;"SCORE=";SCORE;
1220 SOUND 2,30,10,10:FOR I=0 TO 20:NE
XT I:SOUND 2,0,0,0
1230 NEXT BONUS
1240 FOR I=0 TO 200:SETCOLOR 0,I,10:NE
XT I
1250 TIME=TIME-1:OT=TIME
1260 POKE 559,0:POP :GOTO 90
1280 LIFE=LIFE-1:OT=TIME
1290 POSITION OH,OV:? #6;" "
1300 POSITION 15,0:? #6;"MEN:";LIFE;
1310 FOR I=1 TO 100:SETCOLOR 1,I,10:SO
UND 0,I,14,8:NEXT I
1320 SOUND 0,0,0,0
1330 IF LIFE=0 THEN POP :GOTO 1390
1340 FOR I=1 TO 150
1350 SETCOLOR 1,I,10
1360 NEXT I
1370 GOTO 1260
1390 GRAPHICS 18:POKE 16,64:POKE 53774
,64
1400 SETCOLOR 0,8,8:SETCOLOR 1,12,8:SE
TCOLOR 2,8,8
1410 IF SCORE>HIGH THEN HIGH=SCORE
1420 IF LEVEL=11 THEN POSITION 5,1:? #
6;"well done":POSITION 2,2:? #6;"on al
l 10 levels":GOTO 1450
1430 POSITION 5,1:? #6;"game over"
1440 POSITION 5,2:? #6;"on level ";LEV
EL;
1450 GOSUB 1550
1460 POSITION 2,4:? #6;"YOUR SCORE  ";
SCORE;
1470 GOSUB 1550
1480 POSITION 2,6:? #6;"HIGH SCORE  ";
HIGH;
1490 GOSUB 1550
1500 POSITION 4,9:? #6;"PrEsS sTaRt"
1510 IF PEEK(53279)=6 OR STRIG(0)=0 TH
EN GOTO 10
1520 SETCOLOR 3,INT(RND(0)*100),8
1530 SETCOLOR 2,INT(RND(0)*100),10
1540 POKE 77,0:GOTO 1510
1550 FOR I=250 TO 0 STEP -10:SOUND 0,I
,12,6:NEXT I
1560 SOUND 0,0,0,0:RETURN
1580 IF R=1 THEN RETURN
1590 J=1536:RESTORE 1610
1600 READ A:IF A<>-1 THEN POKE J,A:J=J
+1:GOTO 1600
1610 DATA 104,162,0,169,60,133,207,134
,206,169,224,133,205,134,204,32,22,6,3
2,22
1620 DATA 6,96,161,204,129,206,230,206
,208,2
1630 DATA 230,207,230,204,208,242,230,
205,165,205,201,226,208,234,169,224,13
3,205,96,-1
1640 A=USR(1536):POKE 756,60:POKE 1790
,25
1650 ADDR=60*256:RESTORE 1680
1660 FOR I=0 TO 111:READ A:POKE ADDR+8
+I,A:POKE ADDR+520+I,A:NEXT I:A=ADDR+5
20
1680 DATA 24,24,0,60,90,24,36,102
1690 DATA 0,0,78,164,228,164,164,0
1700 DATA 223,223,223,0,251,251,251,0
1710 DATA 90,189,60,90,129,66,36,0
1720 DATA 0,90,165,90,60,126,126,60
1730 DATA 0,0,117,37,37,37,37,0
1740 DATA 0,0,183,244,87,20,23,0
1750 DATA 7,2,2,22,20,252,160,224
1760 DATA 24,24,0,60,90,60,102,0
1770 DATA 0,0,0,255,255,255,0,0
1780 DATA 0,0,78,170,236,170,170,0
1790 DATA 0,0,225,65,65,65,225,0
1800 DATA 0,0,93,81,93,69,221,0
1810 DATA 0,0,220,20,216,20,212,0
1820 READ J:IF J=-1 THEN 1850
1830 READ K:POKE A+J,K:GOTO 1820
1840 DATA 24,90,25,126,26,60,27,90,28,
129,29,129,30,0,31,0,-1
1860 RESTORE 1910:J=1700
1870 READ A:IF A<>-1 THEN POKE J,A:J=J
+1:GOTO 1870
1880 FOR I=1680 TO 1690:READ A:POKE I,
A:NEXT I
1890 A=USR(1680):POKE 54286,192
1900 RETURN
1910 DATA 216,206,254,6,173,254,6,240,
8,169,0,141,255,6,76,98,228,169,25,141
,254
```

```
1920 DATA 6,173,244,2,201,60,240,8,169
,60,141
1930 DATA 244,2,76,173,6,169,62,141,24
4,2,76,173,6,-1
1940 DATA 104,162,6,169,7,160,164,32,9
2,228,96
```



Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
10	3119	20	4562	30	3726
40	871	50	8364	60	7045
70	1985	80	9110	90	9385
100	9661	110	1892	120	1974
130	3880	150	3128	160	8294
170	3791	180	18258	190	1791
210	7034	220	8759	230	8808
240	9009	250	9028	260	9368
270	2768	280	2610	290	5229
300	4757	310	2158	330	7113
340	3579	350	3381	360	4540
370	8953	380	5318	390	3381
400	4540	410	5983	420	4695
430	2310	450	9443	460	4756
470	3754	480	4827	490	11509
500	5900	510	3754	520	4827
530	6526	540	5136	550	3144
560	7211	570	4996	580	1613
600	11917	610	15627	620	4179
630	6345	640	5783	650	4168
660	6261	670	4172	680	3435
690	1774	700	2828	710	2280
720	1708	730	1998	740	1345
750	3429	760	3248	770	3213
780	1345	790	1426	800	2780
810	3459	820	1876	830	3490
840	8868	850	2127	860	2836
870	1498	890	1392	900	2019
910	1402	920	2939	930	3315

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
950	2836	960	2797	970	3862
990	4836	1000	2759	1010	2882
1020	6345	1030	6968	1040	3975
1060	4633	1070	6771	1080	9757
1090	6356	1200	6617	1210	13477
1220	9112	1230	2388	1240	6824
1250	4327	1260	4542	1280	4239
1290	4215	1300	5783	1310	9445
1320	2321	1330	5710	1340	2529
1350	2857	1360	1345	1370	1878
1390	6497	1400	8614	1410	5925
1420	19085	1430	6034	1440	7180
1450	1970	1460	7584	1470	1970
1480	7049	1490	1970	1500	10447
1510	7990	1520	5210	1530	5421
1540	3690	1550	8132	1560	3975
1580	3843	1590	3719	1600	8531
1610	11341	1620	6173	1630	12375
1640	6278	1650	4704	1660	13478
1680	4433	1690	4692	1700	4913
1710	4722	1720	4762	1730	4087
1740	4220	1750	4412	1760	4187
1770	4065	1780	4664	1790	4213
1800	4093	1810	4355	1820	4619
1830	4989	1840	8485	1860	3635
1870	8574	1880	7568	1890	4607
1900	1498	1910	11447	1920	6244
1930	7456	1940	6373		

Constructing a machine code device driver

Part 5 of Andre Willey's series on the Atari's input/ output facilities

BEFORE starting on this month's topic – customising the operating system to your own requirements – let's first answer the question I left you with in the April issue of *Atari User*: Why should it take so much longer to send 1000 bytes of data when using the PUT command than it does with the Binary Put routine we gave you?

Well, the reason is not all that hard to work out if you think about how the OS actually works when you give it a task. Each time you access it to send some data, it first needs to take care of a lot of internal calculations, such as working out the handler addresses and moving the Input/Output Control Block.

Even at machine code speed this takes a little time, and while you won't notice it when you call a routine once, you will start to see the effect if you call the OS 1000 times – and this is why the extra delay occurs.

So far we've looked at the way that the operating system carries out your commands, but let's now examine the potential for expansion that it gives us.

As you know, the OS has a number of internal device drivers – such as those for the cassette, printer and screen – available from the moment you switch on the machine. In addition, there are a number of extra peripherals you can add to your Atari – each of which needs to add its own handler to the existing set.

These include the disc operating system and the RS232 interface routines, both of which are capable of loading – or booting – their own handler routines as required. This facility gives us a very neat way to add our own routines to the OS, or indeed to customise the existing ones.

Program I is a simple machine code device driver. It is not designed to do anything especially useful, but it does demonstrate the basic principles required when constructing a new device handler.

In fact, all each of the six commands does is to change the screen colour so that you can see it has worked. The rest of the program is perfectly valid for any driver, so you could insert your own routines quite easily by replacing the colour changing instructions such as those at lines 540 to 560.

If you think back to the first part of this series you will recall that the OS uses a table of device names and handler addresses known as HATABS (at address $31A) to keep track of the currently available drivers.

This table, shown in Figure I, consists of a single Ascii byte for the handler name – C, P, D, S and so on – plus a two byte number. This is the address of a further table which gives the actual memory locations of the various Open, Close, Put, Get and other data handling routines.

If we want to patch our own driver into the OS, we must first look for a free space in HATABS. Since each three-byte entry starts with an Ascii character, we can check every third byte to find the names used by the OS so far. As soon as we find a zero entry we know that we have come to the end of the used portion of the table, so we can insert our own handler's name and address there. Lines 250 to 400 do this, adding the name X: to the current HATABS list.

In fact, the OS always starts searching from the end of the table, so you could even add a device name that already exists and the new version would then be used instead of the original one.

The two-byte address should point to a 15 byte table (lines 150 to 210) within your machine code which contains six addresses – or vectors - and a jump instruction. These addresses will point to the six major routines that the OS can access – Open, Close, Get, Put, Status and Special.

In fact, due to the internal workings of the OS, the addresses given in your table should be one byte lower than the actual location of the machine code routine. The jump instruction is a simple JMP INIT which will only be used to initialise the handler, and often does nothing more than return with an RTS, as in our example.

When you access your device, the OS checks the ICCOM command byte to decide which of the six routines to use. Open, Close and Status (3, 12 and 13) are obvious, as are the various Put and Get commands (5, 7, 9 and 11), but what about the Special commands such as fill and rename file?

Well, if the OS finds an ICCOM command number greater than the normal maximum of 13, it will use the Special vector at the end of the table, and your driver should check to see whether it can handle the command number requested. By the time your routines take control, the IOCB information will have been transferred into the Zero Page ICOB (ZIOCB) at $20.

This means that you never need to

HATABS + 0	P	$E430 (58416)
HATABS + 3	C	$E440 (58432)
HATABS + 6	E	$E400 (58368)
HATABS + 9	S	$E410 (58384)
HATABS + 12	K	$E420 (58400)
HATABS + 15	D	$07CB (1995)
HATABS + 18	–	$0000
HATABS + 21	–	$0000
HATABS + 24	–	$0000
HATABS + 27	–	$0000
HATABS + 30	–	$0000
HATABS + 33	–	$0000

N.B. Assumes Dos 2.5 present. Unused entries are filled with zeros.

Figure I – The Handler Address Table (HATABS) at $31A (794)

worry which channel number the calling program is using – all the information you require will always be located in the ZIOCB.

The ICCOM command byte will thus always be found at $22 (three bytes into the ZIOCB). In our example, lines 890 to 930 check whether this value is 100 – the only command number that we will allow in this case. Of course, you can check for any numbers you want here, thus allowing a lot of flexibility beyond the normal data in/out operations.

After completing whatever tasks it needs to do, your routine should place any error code into the Y register and update the ZIOCB with any changes which have occurred. Normally the Y register should contain a value of 1 if no error has occurred, as in the Open, Close, Get, Put and Status examples shown.

In the case of the Special command, any ICCOM number other than 100 should generate an error, and hence line 920 sets the Y register to 146 – the error code for Function Not Implemented – and returns.

When writing new handlers you should always bear in mind that the System Reset button will wipe out any user-defined drivers and replace the original rom-based set. Programs that need to get around this problem must trap the Reset routines by means of the CASINI or DOSINI locations.

When the system boots it sets a flag called BOOT? to indicate if any special initilisation will be required when Reset is pushed. If this flag is set to 1, the disc vector at DOSINI is used. If it is 2, then the cassette vector CASINI will be used – and a value of 3 means that both cassette and disc software requires initialising.

To avoid any complications with Dos you can always cheat the system a little and put your initialise address into CASINI and alter the BOOT? flag to 3. This will fool the OS into thinking that a cassette boot has also taken place, and thus initialise your code alongside that of Dos. This is done in lines 420 to 480.

Normally, you would also need to adjust the LOMEM pointers to make sure that nothing overwrites your code. In this case this is not necessary, because our driver is so short that it fits into page 6, which is always protected anyway.

For those of you who don't have access to an assembler, Program II is a Basic version of the handler. It works in exactly the same way but is POKEd into page 6 and initialised via a USR command.

Lines 240 to 530 provide a full demonstration of what each command does, plus the effect of using a value other than 100 in an XIO command. This section may be typed in separately if you have already loaded the handler from an assembled file.

● *Well that's it. You may like to experiment further to find out which types of error are handled by the OS and which are handled by the device driver itself – you may be surprised by how little the OS actually does. You could also have a go at LISTing, LOADing or SAVEing with the X: driver and watch the screen colours change as the OS performs different tasks.*

Program I: The machine code driver

```
10 ;  Demonstration Device Handler
20 ;         By Andre Willey
30 ;   (c) Atari User, June 1987
40 ;
50 ZIOCB =   $20
60 ICCOMZ =  ZIOCB+2
70 CASINI =  $02
80 HATABS =  $031A
90 BOOT? =   9
0100 ;
0110     *=  $0600   ;Use Page 6
0120 ;
0130 ;Handler Vector Table
0140 ;
0150 VECTAB .WORD OPEN-1
0160        .WORD CLOSE-1
0170        .WORD GET-1
0180        .WORD PUT-1
0190        .WORD STATUS-1
0200        .WORD SPECIAL-1
0210        JMP INIT
0220 ;
0230 ;Set up new device name in HATABS
0240 ;
0250 SETUP LDY #0
0260 NEXT LDA HATABS,Y ;Check through
0270      BEQ FOUND     ;HATABS for a
0280      INY           ;zero entry
0290      INY
0300      INY
0310      CPY #30
0320      BNE NEXT
0330      BRK           ;No room in HATABS
0340 ;
0350 FOUND LDA #'X    ;Set up new device
0360      STA HATABS,Y
0370      LDA #VECTAB&255
0380      STA HATABS+1,Y
0390      LDA #VECTAB/256
0400      STA HATABS+2,Y
0410 ;
0420      LDA #SETUP&255 ;Trap Reset
0430      STA CASINI
0440      LDA #SETUP/256
0450      STA CASINI+1
0460      LDA BOOT?    ;Tell OS to use
0470      ORA #2       ;CASINI during
0480      STA BOOT?    ;System Reset
0490      RTS
0500 ;
0510 ;The I/O routines themselves
0520 ;
0530 OPEN
0540      LDA #$00
0550      STA 710      ;SETCOLOR 2,0,0
0560      STA 712      ;SETCOLOR 4,0,0
0570      LDY #1
0580      RTS
0590 ;
0600 CLOSE
0610      LDA #$34
0620      STA 710      ;SETCOLOR 2,3,4
0630      STA 712      ;SETCOLOR 4,3,4
0640      LDY #1
0650      RTS
0660 ;
0670 GET
0680      LDA #$84
0690      STA 710      ;SETCOLOR 2,8,4
0700      STA 712      ;SETCOLOR 4,8,4
0710      LDY #1
0720      RTS
0730 ;
0740 PUT
0750      LDA #$54
0760      STA 710      ;SETCOLOR 2,5,4
0770      STA 712      ;SETCOLOR 4,5,4
0780      LDY #1
0790      RTS
0800 ;
0810 STATUS
0820      LDA #$F4
0830      STA 710      ;SETCOLOR 2,15,4
0840      STA 712      ;SETCOLOR 4,15,4
0850      LDY #1
0860      RTS
0870 ;
0880 SPECIAL
0890      LDA ICCOMZ
0900      CMP #100     ;Command = 100?
0910      BEQ OK       ;Yes..
0920      LDY #146     ;No: Error 146
0930      RTS
0940 ;
0950 OK   LDA #$C4
0960      STA 710      ;SETCOLOR 2,12,4
0970      STA 712      ;SETCOLOR 4,12,4
0980      LDY #1
0990      RTS
1000 ;
1010 INIT RTS          ;No init routine
1020 ;
1030      *=  $02E0   ;Run address
1040      .WORD SETUP
1050      .END
```

Program II: The Basic handler

```
100 REM DEMONSTRATION DEVICE HANDLER
110 REM BY ANDRE WILLEY
```

```
120 REM (C) ATARI USER, JUNE 1987
130 REM
140 REM LINES 180-230 POKE THE HANDLER
        INTO MEMORY AND INITIALISE IT
150 REM LINES 240-530 DEMONSTRATE THE
        OPERATION OF THE DRIVER
160 REM LINE 540-680 IS THE M/CODE
        DRIVER ROUTINE
170 REM
180 CHECK=0:FOR LOC=1536 TO 1676
190 READ BYTE:POKE LOC,BYTE
200 CHECK=CHECK+BYTE
210 NEXT LOC
220 IF CHECK<>13807 THEN ? "ERROR":END
230 A=USR(1666)
240 REM DEMONSTRATE DRIVER
250 LET DELAY=510:GRAPHICS 0
260 ? "          DEMO OF 'X:' DEVICE"
270 ? :? :? "COMMAND:","OPEN...";
280 OPEN #1,8,0,"X:"
290 GOSUB DELAY
300 ? :? ,"PUT BYTE...";
310 PUT #1,A
320 GOSUB DELAY
330 ? :? ,"CLOSE...";
340 CLOSE #1
350 GOSUB DELAY
360 ? :? ,"OPEN AGAIN...";
370 OPEN #1,4,0,"X:"
380 GOSUB DELAY
390 ? :? ,"GET BYTE...";
400 GET #1,A
410 GOSUB DELAY
420 ? :? ,"STATUS...";
430 STATUS #1,A
440 GOSUB DELAY
450 ? :? ,"XIO 100...";
460 XIO 100,#1,0,0,"X:"
470 GOSUB DELAY
480 ? :? ,"XIO 20 (NOT SUPPORTED)...";
490 XIO 20,#1,0,0,"X:"
500 END
510 REM DELAY ROUTINE
520 FOR I=1 TO 750:NEXT I
530 ? " DONE":RETURN
540 REM M/CODE DATA
550 DATA 53,6,64,6,75,6,86,6,97,6,108
560 DATA 6,76,129,6,160,0,185,26,3,240
570 DATA 8,200,200,200,192,30,208,244
580 DATA 0,169,88,153,26,3,169,0,153
590 DATA 27,3,169,6,153,28,3,169,131
600 DATA 133,2,169,6,133,3,96,169,0
610 DATA 141,198,2,141,200,2,160,1,96
620 DATA 169,52,141,198,2,141,200,2
625 DATA 160,1,96,169,132,141,198,2
630 DATA 141,200,2,160,1,96,169,84,141
640 DATA 198,2,141,200,2,160,1,96,169
650 DATA 244,141,198,2,141,200,2,160
660 DATA 1,96,165,34,201,100,240,3,160
670 DATA 146,96,169,196,141,198,2,141
675 DATA 200,2,160,1,96,96,104,32,15
680 DATA 6,165,9,9,2,133,9,96
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
100	6680	110	4037	120	5431
130	871	140	13089	150	12241
160	9572	170	871	180	5141
190	4896	200	3301	210	1856
220	6518	230	2031	240	4691
250	4756	260	5129	270	5074
280	2775	290	2401	300	3602
310	1468	320	2401	330	2828
340	1559	350	2401	360	3825
370	2755	380	2401	390	3486
400	1402	410	2401	420	3301
430	2036	440	2401	450	3169
460	3018	470	2401	480	6163
490	2770	500	836	510	3639
520	3918	530	2980	540	2981
550	5317	560	5483	570	5168
580	4977	590	5053	600	4935
610	5153	620	4892	625	4896
630	5426	640	5252	650	4905
660	5417	670	5264	675	5005
680	4087				

SOFTWARE Solutions

Your programming problems solved by ANDRE WILLEY

Shadow registers

I AM having a bit of trouble with a program I'm trying to write. I have finished the main parts, and I'm now tidying up the screen displays and so on.

My problem is linked to the SETCOLOR statement. Before I read some data in from disc I print a message in Graphics mode 2. However, I often find that the colours I have set do not appear immediately, but often take four or five seconds to come on-screen.

I understand that this has something to do with shadow registers, but I'm not too sure what these are – can you help? – ***A. Pratt, Solihull, West Midlands.***

● You are indeed correct in what you say and the problem is linked to these mysterious shadow colour registers.

There are two types of colour register on the Atari – hardware registers, from which the screen display is generated, and software (or shadow) registers which are used by software and SETCOLOR commands.

The two types are provided to prevent a problem common to many computer display systems: If you change a colour value while the display is being updated on the television you will see an annoying jump on the screen. This is most pronounced when you are using flashing colours.

To avoid this, the Atari only updates the actual hardware colour registers during the blank period between each TV frame – or the Vertical Blank period as it is known.

When you do a SETCOLOR command, the colour value you provide is stored in a temporary colour register – the shadow – until the next Vertical Blank comes along. During this time, all the shadow registers are copied into their hardware counterparts.

Your problem occurs because some of these Vertical Blank tasks are temporarily suspended whenever time-critical tasks such as data transfer are taking place. Thus, whenever you access the disc drive within one-fiftieth of a second after executing a SETCOLOR command, the colours may not appear until the disc I/O has finished.

You can get round this in one of two ways. Firstly you could use a simple FOR...NEXT loop to delay the program until the next Vertical Blank has occurred – a loop of 50 times should be ample for this purpose. Alternatively, you could POKE the hardware register directly.

Each of the software registers (708 to 712) has a hardware equivalent (53270 to 53274). All you need to do is POKE the hardware register with the value held in the shadow. If you have just set the colour of the 708 shadow you could use:

```
POKE 53270,(COLOUR*16)+ BRIGHTNESS
```

This will ensure that the screen display shows the correct colours immediately.

Are you having problems getting your programs to work? Write to Software Solutions, Atari User, Europa House, 68 Chester Road, Hazel Grove, Stockport.

We will answer as many as we can within the pages of *Atari User* but, unfortunately we cannot give personal replies.

Square root snags

I wish to use my recently acquired 800XL to carry out various mathematical calculations. However, I appear to have struck a problem with Atari Basic when attempting to work out squared numbers or roots.

For example, a simple problem of determining the area of a circle of given radius is given by $A=\pi r^2$. In Basic this would be:

```
10 INPUT R
20 LET A=3.14159*R↑230 PRINT R,A 40 END
```

Unfortunately this produces an error message on line 20 requiring the substitution:

```
20 LET A=3.14159*(R*R)
```

This produces the required result. However, visualise the problem when dealing with R^{12}.

Conversely, how does one determine a square root or cube root? In Basic $R=\sqrt{A/\pi}$ might be:

```
R=(A/3.14159)↑0.5
```

But how does one obtain this on the 800XL?

It seems quite easy to produce the ↑ symbol by pressing Escape then Control+ ↑ but each time I try it an error occurs.

I should be extremely grateful if you could supply a solution to this problem as the local computer clubs are unable to help, claiming that the Atari is only a games machine. – ***Mr A. P. Tuite, Tyn-Y-Groes, Gwynedd, Wales.***

● The answer to your problem is actually very simple – the character used when raising numbers to a given power is ^. and is given by pressing Shift+→. This will allow you to use the formula:

```
A=3.14159*R^2
```

You may then use fractional powers for roots, or for a simple square root use:

```
R=SQR(A/3.14159)
```

Because of the way computers handle real numbers, you might find that the final place of decimals is often somewhat inaccurate, in which case you can round off to, say, four decimal places with:

```
X=INT(X*10000+0.5)/10000
```

If you omit the +0.5 you will truncate to four places instead. There – now you can tell everyone what a great machine the Atari really is.

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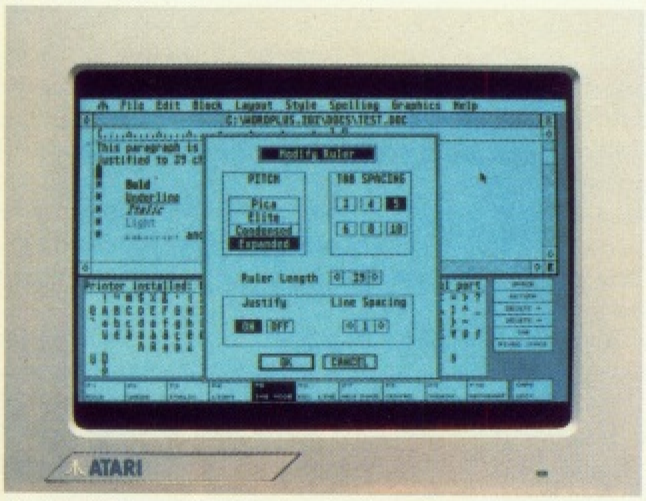
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*Screenshots

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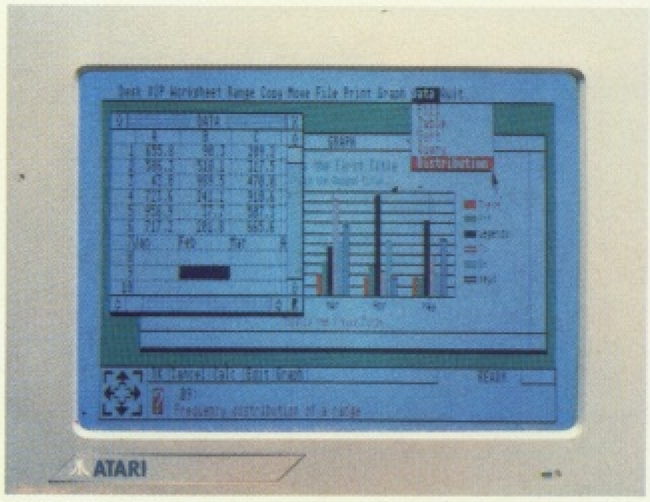
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Your HINTS & TIPS

Mediator

First pass the skeletal horse by going down as far as possible then running up until you are one pixel or so above the bridge. When the horse stops, run quickly across the bridge and he should follow.

You must now cross the lake by doing a 3D version of Frogger, going from turtle to log and so on. When you land on the Island at the centre, the Maniac waving his arms about should disintegrate.

You must now climb the trees and pick the apples, descend and press the fire button to throw them at the horse. The longer the button is pressed the steeper the angle of the throw. After three hits, the horse should wade through the lake and carry you off.

While you are on this screen, if you are called up to fight the enemy, you will find that you have been awarded a forward-firing missile for your endeavour. Just push forward to fire it.

The next screen is nasty because aliens come pouring down from the mountain while you beat frantically on a xylophone in the hope that they'll explode.

Just when I think I've got somewhere that lousy bird flies past, steals my hammer and leaves me well and truly in the lurch. Can anyone help? All I do know is that if you press up on this screen, left and right will steer your missile (from last screen) accordingly.

At this rate, all I can say is your ship on screen eight must be a real mean war-machine with the amount of extra weaponry it's receiving. – *Paul Collins, Lewes, Sussex.*

The Last V.8

(tape only)

IF YOU can't get past the first screen press the Break key as you load the program when the tape counter is around 187. Start the game as normal and when the background disappears move down until you reach a green strip. Move slightly up and horizontally along, alternately accelerating/decelerating. A message should Flash – Entering Inner City – and you then go on to the next screen.

If you don't manage it the first time, don't give up: There is a knack to it. – *S.P. Kershaw, Huddersfield.*

Spindizzy

WHEN you travel along thin pathways that are just hanging in the air change to the form of a gyroscope. Then your craft will only fall off if the tiny point that the whole thing is balanced on wanders too near the edge: It gives you more room for error. – *Paul Collins, Lewes, Sussex.*

One on One

THERE is a mistake in the inlay. It says press 1 or 0 for a time out. This is not so and it is in fact B for Bird and J for Dr.J. – *C.E. Smith, Welling, Kent.*

International Karate

IF YOU hold down X and a number between one and four you can change the speed. Four is slowest and one fastest. – *Gary Bowman, York.*

Polar Pierre

(disc only)

IF you have started a game with one player only and wish to change to two (or vice versa), press Option to go to the construction kit. Remove all discs from the drive and select play on the screen menu. The game should then return you to the title screen where Select should do the trick. – *Paul Collins, Lewes, Sussex.*

Spy vs Spy II: The Island Caper

YOU can drop missile parts just behind foreground trees so that only a pixel or so is visible. In the two player game your opponent tends to miss them, especially if you bury lots of objects around the area to distract him. – *Paul Collins, Lewes, Sussex.*

Aztec

TO OBTAIN infinite dynamite, collect seven sticks then crawl to the end of a ledge with your hand over the edge. Drop the sticks quickly on each other and they will stay in mid-air. The dynamite indicator will become a mass of weird symbols but you will have infinite dynamite. – *C.E. Smith, Welling, Kent.*

Zorro

HERE is the full solution, but you will have to work out a map for yourself.

- Collect the brand, heat it at the forge and brand the ox. You can collect the item that was next to it.
- Collect the mission bells from the hotel and put them at the top of the church with the grave in. The grave will open, but do not enter yet.
- Collect the trumpet from the hotel, stand on the see-saw and press fire. A guard will emerge and fall on to the see-saw, catapulting you into the air. Move along the pole, go up and collect the boot.
- Collect the hanky (if you haven't already) then go down the well and take the goblet in the cellar.
- Now enter the grave and collect the bags of money. When you are in the room with the flashing icons, go high to the far left and push the barrels in the cellar.
- Go back to the hotel and collect the flowers.
- Re-enter the tomb by the cellar and go up to the jail.
- Free the prisoners while avoiding the bullets. The prisoners will form a platform to jump on to the low roof. Enter the next room and then work your way across it.
- On entering the room with the senorita at the top, work your way to the top. When you reach her, the hanky and flowers will be given to her automatically. She will kiss you and music will play. You have completed Zorro. – *C.E. Smith, Welling, Kent.*


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Sound sampling and playing Midi music

IAN WAUGH reviews three packages devoted to tuneful fun

THE Atari XL is hardly blessed with a proliferation of music add-ons, so it is encouraging to see 2 Bit Systems devote its energy to righting this wrong. It already has three music packages for the 48k Atari and more are on the way.

We're looking at three of them this month – Midi Master, Replay and Digidrum/Synth. The first contains six programs – an eight track Midi sequencer, CZ voice editor, DX100/21 voice editor, CZ keyboard split utility and two programs which will play, via Midi, music created with the Music Composer and the Advanced Music System.

You get an interface, too, which plugs into one of the disc drive's I/O ports. It even has six feet of wire attached with Midi DIN plugs on the end so you can connect it straight into your synth. The plugs are marked in pen with an I and an O but these soon rub off, so it's a good idea to tape on a couple of labels.

The trade-off for all these programs is a general lack of facilities, but you do get lots to play with.

The sequencer is controlled from one screen and operation is a piece of pie. You can record on up to eight tracks but each is monophonic, which means it can only record one note at a time.

The tracks are listed down the left side of the screen with seven parameters across the top, REC, PLY, PGM, TRP, REP, LEAD and GAP.

You alter parameters by moving the cursor on to them and typing in new values. Thankfully you don't have to hold down Control to operate the cursor keys – nice one 2 Bit.

REC selects the record channel, PLY selects the play channel, PGM sets a Midi patch or program number which is transmitted to the synth before the music starts and TRP transposes the track over plus or minus 99 semitones.

REP will cause a track to repeat a certain number of times, LEAD lets you delay the start of a track and, finally, GAP will produce a delay before the track repeats.

You can save and load a piece of music, wipe a track and play and record. There is also a time input option which lets you tap out the rhythm of a recorded track. This is the nearest you get to step-time input, as all tracks must be recorded in real-time – but see the Music Player programs.

Let's say straight off that what the sequencer program does it does well but a comparison (however odious that may be) with almost any other piece of Midi software finds it lacking in the facilities department.

For example, one of the main attractions of Midi sequencing is the ability to record a piece slowly and speed it up on playback, but Midi Master can't do this (although you can set the metronome speed to help you keep time as you record).

Other features which you might expect to find are also missing. There are no editing or copying facilities, and it doesn't record velocity or pitch-bend information.

The program doesn't send a Notes Off message when you stop playback, and notes on your synthesiser will drone on until you reset it. It doesn't transmit Midi sync messages, so controlling a drum machine could be awkward.

I'd love to be able to catalogue the disc, too.

Okay, that's a pretty big list, but there is good news. Apart from being easy to use, the program works a treat with Casio CZ synths.

The CZ series are multitimbral instruments, which means they can sound more than one tone at the same time under computer control. It's a doddle to record four parts and by altering the PGM parameter you can experiment with different sounds on playback.

Another bonus for Casio CZ owners is the CZ voice editor. This shows all the synth's parameters on screen at once and you alter them by moving the cursor and typing in new values. It has no frills and can only handle one sound at a time.

If you have a CZ230 this is perfect as it lets you edit the otherwise inaccessible four programmable voices. A CZ menu program lets you instantly load any of the voices on disc.

A new addition to the disc is the CZ split facility which lets you play one sound on the lower end of the keyboard and a different one on the upper end.

The DX100/21 editor performs a similar service on these Yamaha synths and it can even dump a complete bank, although the synths have faster built-in tape dumps.

The two final programs let you load in and play music produced with the Music Composer cartridge and the Advanced Music System. The manual admits there are limitations because of the way the programs handle music data but they can still produce excellent results.

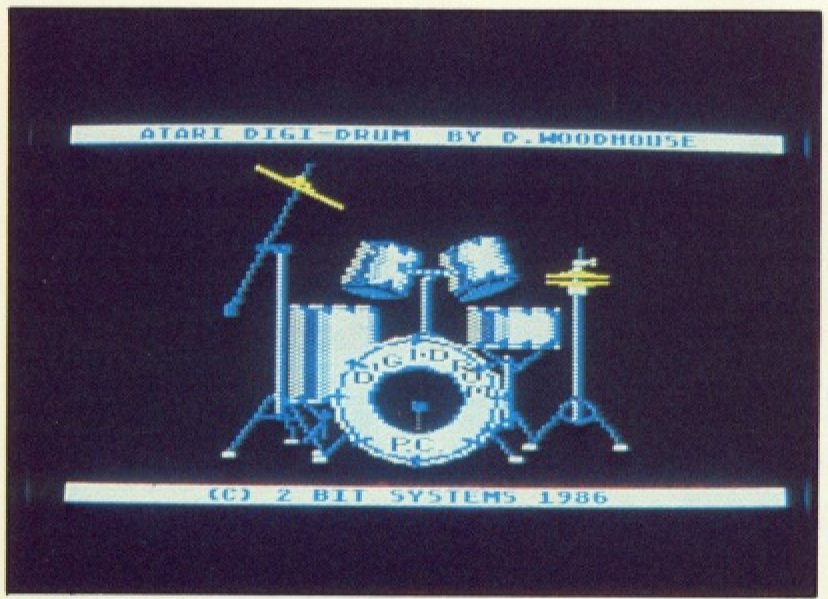
The most amazing part of Midi Master is the price. Even though it may be short on features in a few areas, if you want to make music with Midi and your Atari – and especially if you have a CZ synth – you really cannot afford to be without this package. It is terrific value for money, and if you have a CZ230 it is a must.

Replay is something different – a sound sampling system. The necessary circuitry is housed in a cartridge which plugs into the cartridge port, and there are five programs on the support disc.

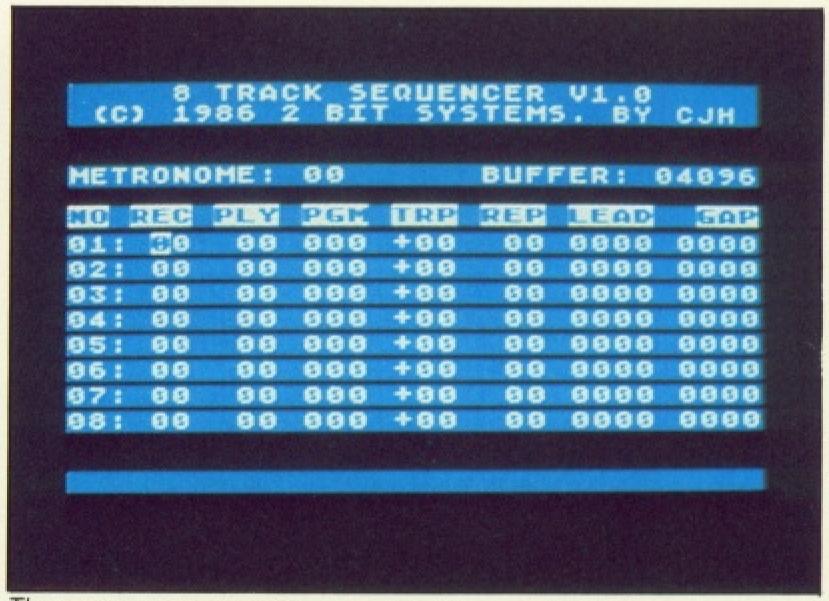
A 15 inch flying lead ending in a mini jack plug runs from the cartridge and plugs into a sound source, such as a tape recorder or hi fi, for sampling purposes. I wish this lead had been a bit longer.

The sampled sound is played back through your TV or monitor speaker and the sound quality suffers accordingly. An audio-out socket would have been nice, and would have made the recording of your Replay experiments easier and cleaner.

The main program is called Replay and this lets you sample and playback a sound. You can select six sampling rates – 6KHz, 8KHz, 10KHz, 12KHz,



2-Bit's Digidrum



The sequencer program

16KHz and 21KHz – which give you between three and 12 seconds sampling time.

The waveform of the sample is shown on screen and you can position start and end markers to select the section you want to hear.

You can load and save samples between these markers, and catalogue the disc. By loading a number of samples and moving the markers each time you can build up a series of sounds one after the other. You can produce some good – and weird – effects like this.

Apart from chopping bits off a sample, you can't do much else to edit it, although there is a reverse option which lets you play the sound backwards. Always great fun, this one.

A calibration meter on screen helps you select the optimum playback level for your tape recorder. There is also an auto trigger function which will trigger the sampler as soon as the sound source reaches a threshold level.

The sampling resolution is eight bits, with a playback resolution of four bits. This means it's not the best quality, but it should be acceptable – and that sums it up nicely considering the sound plays back through the TV speaker.

Careful positioning of the start and end point markers can often get rid of unwanted noise, and good recording procedure is very important, too.

You have to set the output and recording levels carefully to get the best results.

The User program allows you to use samples in your own Basic routines: What makes this especially useful is that you don't need the cartridge to play them back, so you can give copies of your programs to your friends. Imagine your program saying, "Now press Fire!" – or whatever other words your mind can conjure up. The sample does occupy memory of course, but not so much that you couldn't write some interesting programs.

Digidrum converts your Atari into a software-based drum machine which uses drum samples taken with Replay at a sample rate of 10KHz. You can program up to 29 patterns of up to 28 steps and chain them into a song.

A song consists of up to 32 steps, each step consisting of a pattern number and the number of times it is to be repeated. This construction is similar to the method used by many dedicated drum machines.

Options are accessed from pull-down menus and you select the pattern (to be edited), then edit mode, followed by play, which is a bit fussy. It would be nice if you could hear the pattern and select patterns from the edit screen.

You can't load in new samples in place of the existing drum sounds, which would have been terrific, but perhaps that's asking a bit much. (Watch out for 2 Bit's Percussion Master, which lets you do just that!)

Available sounds include bass drum, snare, mid tom, low tom, cowbell, hand clap and open and closed hi hats. You can only play two drums at once, and certain combinations can't sound at the same time (such as the hi hats and the cowbell) but you can produce some pretty good results with a little thought and careful programming.

Digisynth, as you may guess from the name, does for sequencers what Digidrum does for drums. You can load new voices into Digisynth and use them to play a sequence of up to 256 notes within a single octave range.

Now you can program a dog barking, "How Much is that Doggy in the Window – Woof! Woof!" – something I've always wanted to do since seeing it on a Tomorrow's World programme.

The pitch only ranges from C up to B. That missing C at the top is rather restricting – as, indeed, is the one octave limitation – but you can enter and play back simple tunes quite effectively. It is interesting to hear how the character of a tune can alter when played with different sounds.

New to the package is Echo, which can produce a delay ranging from 2/100ths of a second to 1.3 seconds. It can do some rather funny things to recorded music, and it will work on your speech too, although you will probably need an adapter of some sort to go between the mini jack on Replay and a microphone.

Although all the programs are simple you can have a lot of fun with them. A bit more scope and a few more features would be nice but, as with Midi Master, you get a lot of programs in the package.

The significantly more powerful features and intricate hardware required to run the system is reflected in the higher price of Replay. It hardly costs an arm and a leg as sampling systems go, but if you want to make extensive use of it in recording you may find it lacks facilities you really need.

The good news is that the Digidrum and Digisynth programs are available together for the ridiculous sum of £4.95. This is a prime example of software being cheap even if it were twice the price. Buy these if you buy nothing else!

2 Bit is currently working on an enhanced version of Midi Master which will include a 16 track polyphonic sequencer and a score writer. Now that will be something.

Products: Midi Master £27.50. Replay £39.95. Digidrum/Synth twinpack £4.95.
Supplier: 2 Bit Systems, 44 Morcom Road, Dunstable, Beds, LU5 4EG.
Tel: 0582 696526

ACE – the final frontier

STEPHEN WILLIAMSON closes his series with the last two modules of his advanced character editor

PART three, the final section of the ACE character set editor program, adds the Pad and Animation modules. It will not run on its own, but must be merged with Parts one and two that appeared in *Atari User* in April and May.

Once you have typed in Part three, list it to tape using the LIST "C:" command, or to disc with LIST "D:ACE3".

With Part three in memory enter the combined Parts one and two from last month by using ENTER "C:" or ENTER "D:ACE1AND2" and you will have the complete version of ACE which can then be saved to tape or disc using the command SAVE"C:" or SAVE "D:ACE".

The extra commands now available are as follows:

PAD(P): Used to create multi-character graphics. It is also used to design animation frames used during the Animation section.

To enter Pad press P. There are further commands associated with Pad and these are listed on the right hand side of the menu display. Like the main commands, they are accessed by pressing a single key. When returning from a Pad command, ACE will redisplay the Pad menu. To exit from the Pad menu and return to the main menu press Escape.

ATASCII(A): Affects all characters on the Pad display.

When this function is on, all characters will be displayed as standard Atari characters. Pressing A again returns the Pad display to the redefined shapes. This helps you keep track of what shape has been assigned to which character.

When leaving Pad mode the selected character set (Atari or redefined set) remains on the Pad display.

MODE(M9): The bottom section of the screen display is the Pad design section. When ACE is first run all characters printed to the Pad display will be in Graphics 0. To change to a Graphics 1 or 2 screen press M and select the mode required.

PRINT(P): When the Print option is accessed a rectangular flashing cursor will appear on the Pad display. Any character key that you press will be printed to the Pad screen at the current cursor position. The cursor is moved around the screen by means of a joystick.

In Graphics 0 do not use any non-character keys such as Delete, Tab or Insert. You should also avoid using the * key as it is used to make up the cursor square.

In Graphics 0 use the Caps and Inverse keys to select uppercase, lowercase and inverse characters. In Graphics 1 and 2 these keys are used to select a colour from the palette of four foreground colours. Because of this, only 64 characters are available in modes 1 and 2 – uppercase letters, numbers and symbols (screen codes 0 to 63). Screen codes 64 to 127 – lowercase and Control+key graphic symbols – are not available.

For Graphics 1 and 2 characters the four colours are selected by means of the Caps and Inverse video keys:

Caps on/Inverse off	Colour 1
Caps off/Inverse off	Colour 2
Caps on/Inverse on	Colour 3
Caps off/Inverse on	Colour 4

This is true for the 26 letters of the alphabet, but numbers and symbols act differently – refer to the discussion of the Basic COLOR statement in *Your Atari Computer* for more information.

Because the Escape key is accepted as a valid character in Graphics 1 and 2 it cannot be used to exit from the Print option. Instead, press the Start function key to return to the Pad menu – then press Escape if you want to return from Pad to the main menu.

WIPE(W): To erase the Pad display press W – this operation takes a few seconds.

Wipe fills all the current Pad display with spaces. It is possible to edit the space character just like any other during the Edit option, but in normal circumstances this is not recommended unless you deliberately want to create a textured background.

One interesting aspect of editing the space character is to create artifacting effects which take advantage of how your television handles colour information. Try editing the space character so that it resembles a chess board with alternate pixels plotted.

On a Graphics 1 or 2 Pad display print large blocks of space character using different colours. As if by magic more colours will appear. Switch to graphics 0 and what is normally a two colour mode (foreground and background) has acquired other colours. This effect is more dramatic with some colours than others – try experimenting with this effect using the Colour option.

SCREEN CHANGE(1-9): ACE has the facility to hold up to nine separate Pad displays in memory for use in the Animation mode or for storing graphic designs. To switch from one screen to another press keys 1 to 9 from the Pad mode. When in the Print/Pad mode, use the Option key to go up a screen and the Select key to go down.

When saving Pad screens you will be prompted to specify how many screens to save. As well as saving the data, ACE also saves the colour registers so that, when loading screens from cassette or disc, the colour registers will be changed back to the saved values.

ANIMATION(A): The animation facility displays a quick succession of Pad screens to create graphic movies.

This mode is entered by pressing key A from the main menu. A Pad screen (1 to 9) may be allocated for each frame of the animation.

Press Escape after entering the screen number of the final frame in your animation sequences – these need not be the maximum nine frames. The frames will then be display in quick succession.

Animation speed is preset to 1 (fast). To change speed move the joystick down(slower) or up(faster). The animation sequence will stop while the speed is being adjusted. Press the fire button to return to animation. To stop animation and return to the main menu press Escape.

The animation effect is handled by a Basic subroutine and achieves high speed smooth animation without

```
980 IF KEY=10 THEN GOSUB 1030:GOSUB 52
20:KEY=255
990 IF KEY=63 THEN GOSUB 1030:GOSUB 62
10:KEY=255
5215 REM ACE PART 3
5220 REM PAD
5230 GOSUB 2960:POSITION 2,8:? "PAD"
5240 GOSUB 2550
5250 POKE 764,255:POKE 209,1:POSITION
27,3:? "SCREEN ";SCREEN
5260 IF PEEK(1548)=M THEN POSITION 27,
7:? "ATASCII"
5270 IF PEEK(1548)=224 THEN POSITION 2
7,7:? "ATASCII"
5280 POSITION 27,9:? "PRINT"
5290 POSITION 27,8:? "MODE"
5300 POSITION 27,10:? "WIPE"
5310 POKE 764,255
5320 IF PEEK(209)=2 THEN POKE 209,1
5330 IF PEEK(764)=255 THEN 5330
5340 POKE 209,1:GET #1,KEY:POKE 209,1
5350 IF KEY=27 THEN GOSUB 1030:GOSUB 2
550:RETURN
5360 IF KEY=77 THEN GOSUB 1030:GOSUB 5
490:POKE 209,1:GOTO 5240
5370 IF KEY=87 THEN GOSUB 1030:GOSUB 5
430:GOSUB 2550:GOTO 5240
5380 IF KEY=65 AND PEEK(1548)=224 THEN
 POKE 1548,M:GOSUB 1030:POKE 209,1:GOT
O 5240
5390 IF KEY=65 AND PEEK(1548)=M THEN P
OKE 1548,224:GOSUB 1030:POKE 209,1:GOT
O 5240
5400 IF KEY=80 THEN GOSUB 1030:POKE 20
9,1:GOSUB 5610:GOTO 5240
5410 IF KEY>48 AND KEY<58 THEN GOSUB 1
030:POSITION 27,3:SCREEN=KEY-48:? "SCR
EEN ";SCREEN:GOSUB 6780:GOTO 5240
5420 ? CHR$(253):GOTO 5240
5430 REM PAD WIPE
5440 GOSUB 2550:POSITION 27,10:? "WIPE
"
5450 GOSUB 2000
5460 IF KEY<>89 THEN RETURN
5470 FOR I=0 TO 320:POKE SM(SCREEN)+I,
0:NEXT I:RETURN
5480 REM MODE
5490 GOSUB 2550:POSITION 27,8:? "GR.0,
1 OR 2?"
```

using machine code. The data from each Pad screen is stored in a separate area of ram.

The screen display list is customised so that the operating system points to the area of ram where the first Pad screen is located. By swiftly updating this pointer in the display list using a technique known as page-flipping, an animation effect is achieved. Lines 6210 to 6830 of ACE organise this operation.

In conjunction with Animation, Pad can be used to design the movements of arcade game characters such as aliens or walking men. In some applications Player/Missile graphics are useful for arcade game animation – but often redesigned characters are better for the job and are much easier to control.

Many commercial arcade games, such as Gauntlet, use redefined characters, and you should quickly find that ACE will become an invaluable part of your graphics program library.

```
5500 POKE 764,255
5510 POSITION 27,7:? "MODE"
5520 IF PEEK(209)=2 THEN POKE 209,1
5530 IF PEEK(764)=255 THEN 5520
5540 POKE 209,1:GET #1,KEY:POKE 209,1
5550 IF KEY<48 OR KEY>50 THEN ? CHR$(2
53):RETURN
5560 IF KEY=48 THEN FOR I=25 TO 31:POK
E DLIST+I,2:NEXT I:POKE DLIST+22,66:PA
D=0
5570 IF KEY=49 THEN FOR I=25 TO 31:POK
E DLIST+I,6:NEXT I:POKE DLIST+22,70:PA
D=1
5580 IF KEY=50 THEN FOR I=25 TO 28:POK
E DLIST+I,7:NEXT I:POKE DLIST+22,71:PA
D=2
5590 RETURN
5600 REM PRINT
5610 POSITION 27,9:? "PRINT":POSITION
27,10:? "WIPE"
5620 GOSUB 6780:CUR1=0
5630 POKE 752,0:POKE 764,255
5640 ROW=0:COL=0:POKE 86,0
5650 POKE 764,255
5660 POKE 84,ROW:POKE 85,COL
5670 POKE 87,1:HIBYTE=INT(SM(SCREEN)/2
56):LOBYTE=SM(SCREEN)-HIBYTE*256:POKE
88,LOBYTE:POKE 89,HIBYTE
5680 POKE 764,255
5690 IF PEEK(209)=2 THEN POKE 209,1
5700 IF PEEK(764)<>255 THEN GET #1,KEY
:IF KEY<>125 THEN ? #6;CHR$(KEY);:POKE
 764,255:CUR1=CUR1+1
5710 FLG=PEEK(694):SHF=PEEK(702):CC=10
5720 IF PAD>0 AND FLG=128 AND SHF=0 TH
EN CC=202
5730 IF PAD>0 AND FLG=128 AND SHF=64 T
HEN CC=138
5740 IF PAD>0 AND FLG=0 AND SHF=0 THEN
 CC=74
5750 L=PEEK(CUR1+SM(SCREEN)):POKE CUR1
+SM(SCREEN),CC
5760 FOR D=1 TO 2:NEXT D:POKE CUR1+SM(
SCREEN),L
5770 IF PAD=0 AND PEEK(84)=16 THEN POK
E 84,0:POKE 85,0:CUR1=0
5780 IF PAD=1 AND PEEK(84)=8 THEN POKE
 84,0:POKE 85,0:CUR1=0
5790 IF PAD=2 AND PEEK(84)=4 THEN POKE
 84,0:POKE 85,0:CUR1=0
5800 IF STICK(0)<>15 THEN GOSUB 5860
5810 IF PEEK(53279)=6 THEN GOSUB 1030:
GOSUB 5920:POKE 702,64:POKE 694,0:POKE
 209,1:RETURN
5820 IF PEEK(53279)=3 AND SCREEN<9 THE
N SCREEN=SCREEN+1:GOSUB 6780:POKE SM+1
54,SCREEN+16:GOSUB 1030:GOTO 5670
5830 IF PEEK(53279)=5 AND SCREEN>1 THE
N SCREEN=SCREEN-1:GOSUB 6780:POKE SM+1
54,SCREEN+16:GOSUB 1030:GOTO 5670
5840 GOTO 5700
5850 REM MOVE CURSOR
5860 ROW=PEEK(84):COL=PEEK(85)
5870 ST=STICK(0):IF PEEK(764)<>255 THE
N RETURN
5880 IF PAD=0 THEN GOSUB 6000
5890 IF PAD=1 OR PAD=2 THEN GOSUB 6110
5900 POKE 84,ROW:POKE 85,COL
5910 RETURN
5920 REM RETURN
5930 POKE 87,0
5940 HIBYTE=INT(SM/256):LOBYTE=SM-(HIB
YTE*256)
5950 POKE 88,LOBYTE:POKE 89,HIBYTE
5960 POKE 752,1
5970 GOSUB 2550
5980 B=PEEK(CUR)
5990 RETURN
6000 REM CURSOR MODE
6010 IF ST=7 THEN COL=COL+1:CUR1=CUR1+
1
6020 IF COL=20 THEN COL=0:ROW=ROW+1:IF
 ROW=16 THEN ROW=15:CUR1=CUR1-1:COL=19
6030 IF ST=11 THEN COL=COL-1:CUR1=CUR1
-1
6040 IF COL=-1 THEN COL=19:ROW=ROW-1:I
F ROW=-1 THEN ROW=0:COL=0:CUR1=CUR1+1
6050 IF ST=13 THEN ROW=ROW+2:CUR1=CUR1
+40
6060 IF ROW=16 THEN ROW=14:CUR1=CUR1-4
0
6070 IF ROW=17 THEN ROW=15:CUR1=CUR1-4
0
6080 IF ST=14 AND ROW>1 THEN ROW=ROW-2
:CUR1=CUR1-40
6090 POKE 84,ROW:POKE 85,COL
6100 RETURN
6110 REM CURSOR MODE 1
6120 IF ST=7 THEN COL=COL+1:CUR1=CUR1+
1
6130 IF COL=20 THEN COL=0:CUR1=CUR1-20
6140 IF ST=11 THEN COL=COL-1:CUR1=CUR1
-1
6150 IF COL=-1 THEN COL=19:CUR1=CUR1+2
0
6160 IF ST=13 AND PAD=1 AND ROW<7 THEN
 ROW=ROW+1:CUR1=CUR1+20
6170 IF ST=13 AND PAD=2 AND ROW<3 THEN
 ROW=ROW+1:CUR1=CUR1+20
6180 IF ST=14 AND ROW>0 THEN ROW=ROW-1
:CUR1=CUR1-20
6190 POKE 84,ROW:POKE 85,COL
6200 RETURN
6210 REM ANIMATE
6220 GOSUB 2540:GOSUB 2960:FOR I=1 TO
9:ORDER(I)=1:NEXT I
6230 POSITION 2,0:? "ANIMATE":I=1
6240 POSITION 27,7:? "FRAME ";I;" ?";
6250 POKE 764,255
6260 GOSUB 6680
6270 GET #1,KEY
6280 IF KEY=27 THEN GOSUB 1030:GOTO 63
80
6290 IF KEY<49 OR KEY>57 THEN ? CHR$(2
53):GOTO 6270
6300 GOSUB 1030
6310 SCREEN=KEY-48:IF I<10 THEN ORDER(
I)=SCREEN
6320 POSITION 27,3:? "SCREEN ";SCREEN;
6330 IF I=10 THEN GOSUB 1030:GOTO 6380
6340 I=I+1
6350 GOSUB 6680
6360 GOSUB 6780
6370 GOTO 6240
6380 REM MOVEMENT
6390 I=I-1:POKE 1652,0:IF ORDER(1)=0 T
HEN RETURN
6400 POSITION 26,7:? SP$:POSITION 27,7
:? ;I;" FRAMES
6410 SPEED=1
6420 FOR Z=1 TO I
6430 POSITION 27,3:? "SCREEN ";ORDER(Z
)
6440 POSITION 27,4:? "SPEED ";SPEED
6450 HIBYTE=INT(SM(ORDER(Z))/256)
6460 LOBYTE=SM(ORDER(Z))-HIBYTE*256
6470 POKE 1650,LOBYTE
6480 POKE 1651,HIBYTE:POKE 1652,1
6490 IF PEEK(764)=28 THEN POKE 764,255
:GOSUB 1030:SCREEN=ORDER(Z):POP :RETUR
N
6500 IF STICK(0)<>15 THEN GOSUB 6600
6510 FOR D=1 TO SPEED:NEXT D
6520 NEXT Z
6530 FOR D=1 TO SPEED:NEXT D
6540 GOTO 6420
```

```
6550 HIBYTE=INT(SM(ORDER(Z))/256)
6560 LOBYTE=SM(ORDER(Z))-HIBYTE*256
6570 POKE 1650,LOBYTE
6580 POKE 1651,HIBYTE:POKE 1652,1
6590 RETURN
6600 REM CHANGE SPEED
6610 GOSUB 1030
6620 IF STICK(0)=14 AND SPEED>0 THEN S
PEED=SPEED-1
6630 IF STICK(0)=13 THEN SPEED=SPEED+1
6640 POSITION 27,4:? "SPEED     ";CHR$(
30);CHR$(30);CHR$(30);SPEED
6650 IF STRIG(0)=0 THEN GOSUB 1030:RET
URN
6660 GOTO 6620
6670 REM DISPLAY ORDER
6680 POSITION 27,8:? "1";ORDER(1);" ";
6690 POSITION 30,8:? "2";ORDER(2);" ";
6700 POSITION 33,8:? "3";ORDER(3);" ";
6710 POSITION 36,8:? "4";ORDER(4);" ";
6720 POSITION 27,9:? "5";ORDER(5);" ";
6730 POSITION 30,9:? "6";ORDER(6);" ";
6740 POSITION 33,9:? "7";ORDER(7);" ";
6750 POSITION 36,9:? "8";ORDER(8);" ";
6760 POSITION 27,10:? "9";ORDER(9);" "
;
6770 RETURN
6780 REM CHANGE SCREENS
6790 HIBYTE=INT(SM(SCREEN)/256)
6800 LOBYTE=SM(SCREEN)-HIBYTE*256
6810 POKE DLIST+23,LOBYTE
6820 POKE DLIST+24,HIBYTE
6830 RETURN
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
980	8417	990	8455	5215	2669
5220	1285	5230	7315	5240	1973
5250	10322	5260	9218	5270	11303
5280	4963	5290	4623	5300	4860
5310	2121	5320	5466	5330	4444
5340	5849	5350	8624	5360	10528
5370	10581	5380	13260	5390	13554
5400	10511	5410	20154	5420	3555
5430	2288	5440	7794	5450	1928
5460	4547	5470	9680	5480	1586
5490	9098	5500	2121	5510	5643
5520	5466	5530	4453	5540	5849
5550	8285	5560	14148	5570	14157
5580	14161	5590	1498	5600	2066
5610	11249	5620	3390	5630	4179
5640	4136	5650	2121	5660	4619
5670	18956	5680	2121	5690	5466
5700	16531	5710	6006	5720	7580
5730	7781	5740	6797	5750	9112
5760	8232	5770	10128	5780	9469
5790	9457	5800	5708	5810	15393
5820	20042	5830	20024	5840	1877
5850	3092	5860	4809	5870	8152
5880	4423	5890	5870	5900	4619
5910	1498	5920	2171	5930	1799
5940	8161	5950	6205	5960	1844
5970	1973	5980	2208	5990	1498
6000	3183	6010	6498	6020	13823

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
6030	6368	6040	13817	6050	6608
6060	6835	6070	6842	6080	8386
6090	4619	6100	1498	6110	3394
6120	6498	6130	6517	6140	6368
6150	6619	6160	10071	6170	10059
6180	8376	6190	4619	6200	1498
6210	2166	6220	9940	6230	8170
6240	5496	6250	2121	6260	2004
6270	1876	6280	6720	6290	8314
6300	1940	6310	8367	6320	6402
6330	5836	6340	917	6350	2004
6360	2008	6370	1880	6380	2502
6390	8322	6400	9436	6410	1396
6420	2166	6430	6621	6440	5679
6450	5469	6460	6098	6470	3182
6480	5306	6490	14189	6500	5696
6510	4499	6520	1379	6530	4499
6540	1878	6550	5469	6560	6098
6570	3182	6580	5306	6590	1498
6600	3196	6610	1940	6620	8569
6630	6401	6640	10574	6650	6844
6660	1884	6670	3551	6680	6262
6690	6256	6700	6269	6710	6282
6720	6294	6730	6288	6740	6301
6750	6314	6760	6631	6770	1498
6780	3777	6790	5098	6800	5890
6810	4198	6820	4186	6830	1498

Check up on the taxman

Ernie Little's program might just get you that income tax rebate . . .

PAYING income tax is no fun at the best of times, but at least with this program you can anticipate how much cash will be left in your pocket next pay day.

Before working out the calculation it needs to know what your tax code is, which tax period your next pay day will be in, how much you've earned, how much tax you've paid on those earnings and how much you expect your next pay to be before any deductions.

Your tax code is issued by the local tax office and is in the form 233L. The actual number can be almost anything but 233 is normal for single people or married women and 369 for married men or others who are claiming a married man's allowance (for instance a single parent).

The letter following the number would normally be L as shown, H or T. None of these letters affects the way in which tax is calculated. Certain other letters however may affect calculation and are outside the scope of this program.

National Insurance calculations in the program are based on a person who pays NI contributions under weekly table A. This will cover all working men and single women who are not classed as self-employed, any working married women who are not entitled to be on B rate and is not self-employed, and in all cases, not contracted out of the State pension scheme and under the current legal retirement age.

The way this program calculates your income tax is to start with your tax code. A tax code of 233 means that you may earn up to £2335 a year before you need to pay tax at all. This is just under £45 a week. A married man with a tax code of 369 can earn £3695 a year, just under £72 a week, without incurring tax liability.

The amount of tax-free pay which you are entitled to for week X is calculated and this figure is deducted from the total wages earned for the current tax year, up to and including the week in which you will receive the amount entered in the input routine.

If your total taxable earnings in any one tax year are less than £17,100 you will be taxed at the rate of 27 per cent. If you exceed that figure, you will have to pay tax at 40 per cent on all taxable pay earned between £17,100 and £20,100.

The rate then increases to 45 per cent for the next £3,000 spread. There are other bands up to 65 per cent and the program caters for these too.

National Insurance is calculated differently. In this case there is a base line and a ceiling. Any earnings below this line, currently £39 a week, attract no contributions up to the maximum amount payable of £25.80 a week irrespective of the amount earned.

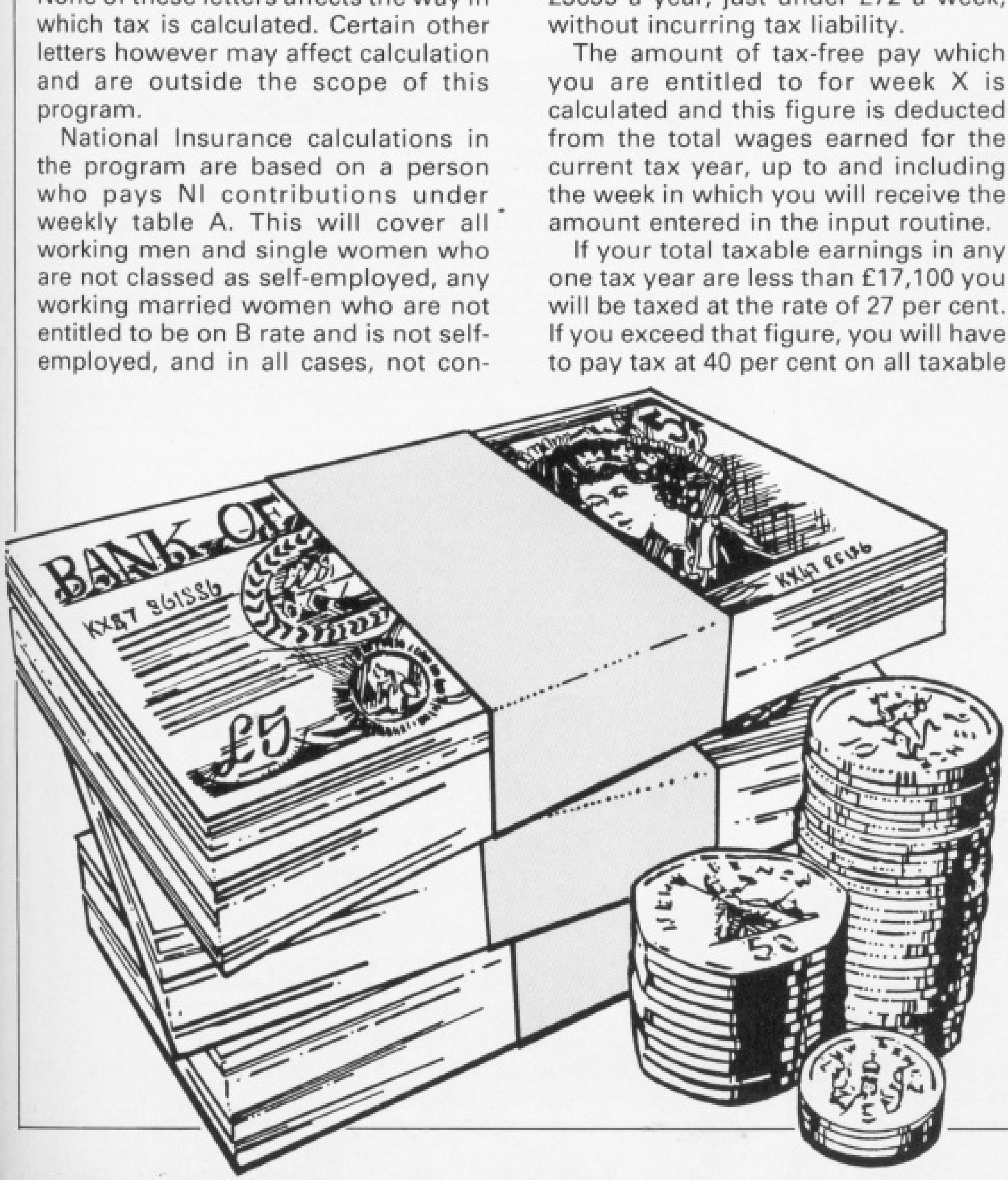
For all points in between, the amount due depends on the gross pay for that week. From the base line to £70 the figure is 5 per cent, from £70.01 to the ceiling it is 9 per cent.

Unlike income tax calculations, amounts earned during the year have no effect. If you earn £20 one week and £100 the next, you will pay no NI contribution for the first week and £9 for the second.

Once the tax and NI has been calculated, nett pay is found by subtracting these two amounts from your gross pay.

This program draws a bar chart and shows the figures for Tax, NI due, and nett pay both as money and as a percentage of your total earning that week.

If you have entered the information incorrectly, or you are due a rebate, the bars may exceed the limit of the screen. This should not be a problem and will leave you secure in the knowlege that you are due a nice fat tax rebate.




```
10 REM TAX CALCULATOR PROGRAM
20 REM ************************
30 GRAPHICS 0:SETCOLOR 2,0,0:POKE 752,
1
40 POSITION 9,0:? "INCOME TAX CALCULAT
OR"
45 POSITION 9,1:? "--------------------
--"
```

```
47 POSITION 6,3:? "ENTER NUMERIC VALUE
S ONLY!"
50 POSITION 2,6:? "ENTER TAX CODE":INP
UT TAXCODE
60 POSITION 2,8:? "ENTER PAY EARNED TO
 DATE":INPUT PAY
70 POSITION 2,10:? "ENTER TAX PAID TO 
DATE":INPUT TTD
80 POSITION 2,12:? "ENTER TAX WEEK":IN
PUT WEEK
90 POSITION 2,14:? "FINALLY ENTER PAY 
DUE THIS WEEK":INPUT PADUE
95 REM CALCULATIONS FOR GRAPH
96 REM **********************
100 TAXRATE=0.27
200 IF PAY+PADUE>17200 THEN RATE=0.4
210 IF PAY+PADUE>20200 THEN RATE=0.45
220 IF PAY+PADUE>25400 THEN RATE=0.5
230 IF PAY+PADUE>33300 THEN RATE=0.55
240 IF PAY+PADUE>41200 THEN RATE=0.6
250 LET TAXFREE=(TAXCODE*10)+5
260 LET PAYTOT=PAY+PADUE
270 TAXDUE=(PAYTOT-((TAXFREE/52)*WEEK)
)*TAXRATE
280 TAXTOPAY=(INT((TAXDUE-TDT)*100))/1
00
300 IF PADUE<39 THEN NIFRAC=0
310 IF PADUE>=39 THEN NIFRAC=0.05
320 IF PADUE>=65 THEN NIFRAC=0.07
330 IF PADUE>=100 THEN NIFRAC=0.09
340 IF PADUE>=295 THEN NIDUE=25.65
350 NIDUE=PADUE*NIFRAC
360 TAXPL=(TAXTOPAY/PADUE)*100
370 NIPL=(NIDUE/PADUE)*100
380 NETT=PADUE-TAXTOPAY-NIDUE
810 TAXBAR=INT((TAXTOPAY/PADUE)*20)
820 NIBAR=INT((NIDUE/PADUE)*20)
830 NETTBAR=INT((NETT/PADUE)*20)
835 ? CHR$(125)
1000 FOR A=1 TO 13:POSITION 6,6+A:? CH
R$(4):NEXT A:POSITION 6,20:? CHR$(26)
1001 FOR A=1 TO 20:POSITION 6+A,20:? C
HR$(23):NEXT A
1002 POSITION 6,21:? "0 1 2 3 4 5 6 7 
8 9 10"
1003 POSITION 0,8:? "GROSS.":POSITION 
3,9:? "PAY":POSITION 0,11:? "INCO.":PO
SITION 3,12:? "TAX"
1004 POSITION 0,14:? "N.INS.":POSITION
 3,15:? "DUE":POSITION 0,17:? "NETT.":
POSITION 3,18:? "PAY"
1005 FOR A=1 TO 20:POSITION 6+A,8:? CH
R$(160);"$";:NEXT A:? PAYTOT
1006 FOR A=1 TO TAXBAR:POSITION 6+A,11
:? CHR$(160);"$";TAXTOPAY:NEXT A
1007 FOR A=1 TO NIBAR:POSITION 6+A,14:
? CHR$(160);"$";NIDUE:NEXT A
1008 FOR A=1 TO NETTBAR:POSITION 6+A,1
7:? CHR$(160);"$";NETT:NEXT A
1009 POSITION 9,2:? "INCOME TAX CALCUL
ATOR"
1010 POSITION 9,3:? "-----------------
1011 POSITION 9,23:? "PERCENTAGE OF PA
Y"
1012 POSITION 29,20:? "(*10)"
1013 GOTO 1013
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
10	5302	20	3517	30	6952
40	7503	45	5975	47	8754
50	9160	60	10222	70	10059
80	8420	90	12177	95	5385
96	3517	100	2392	200	5770
210	5980	220	5780	230	5993
240	5785	250	4969	260	4410
270	8716	280	6905	300	4953
310	5608	320	5612	330	5421
340	5509	350	3858	360	5190
370	4231	380	5748	810	6171
820	5234	830	5582	835	1737
1000	12907	1001	8448	1002	6077
1003	17003	1004	17037	1005	11180
1006	12296	1007	11431	1008	11565
1009	7509	1010	5981	1011	6953
1012	4035	1013	1867		

Putting on an art show

MICHAEL BAXTER shows how to give a professional look to your picture display

ONE of the few things Atari left out of its touch tablet graphics package was an artshow program, similar to that included in paint. This allows you to display your creations one after the other – in a specified order – automatically.

With this in mind, I wrote this picture handling utility.

When the program is run you are presented with six options:

Enter picture display order: Lists all the picture files you have on the disc. They must have the extension .PIC to be listed and be in compacted form, as this program will not operate with the 62 sector micropainter files. To enter the picture order, use the cursor keys to move up and down the columns. Press Return when you wish to include a picture and the display number will appear on the right of the filename. When finished, press Escape to return to the main menu.

Set up colour scroll values: Replaces the rainbow colour option on the Atari Artist cartridge and is much more flexible in its use. It allows control over direction and speed of the colour scroll. There is also a random setting which creates interesting effects. The default setting is fast scroll up.

Picture disintegrate toggle: Disintegrates the displayed picture before the next is loaded in when the option is turned on. If it is off, the picture will just blank out before the next one is loaded.

Next picture by delay/keypress: Loads the pictures automatically with a selected time delay if toggled on. Otherwise, you press a key to start each picture loading.

Start art show: Allows you to start the art show if you have entered the display order. If you have opted for a time delay, then enter how long in seconds you wish the picture to remain on-screen. You will then be asked if you want to see the picture loading. Enter Y or N or press Return if you want to use the displayed default setting. Pictures will then load.

When a picture is being displayed, press keys 0, 1, 2 and 4 to use the colour scroll facility – you cannot use this if you are using a time delay. Press any other key to load the next picture.

Leave program: Returns you to Basic.

PROGRAM BREAKDOWN

10-20	Variables.
5000-5220	Poke in machine code and data tables.
7000-7085	Main options page.
7100-7163	Reads picture filenames, displays them and allows you to input picture order.
7200-7250	Set up colour scroll values.
7300-7301	Auto disintegrate toggle.
7350	Clear screen routine.
7360	Leave program.
7400-7401	Determines whether time delay or keypress is to be used.
7500-7592	Loads pictures, handles colour scroll and disintegrate routines.

MAIN VARIABLES

N-N10	Numbers 0-10.
SLD	Location of machine code.
BYTES	Number of bytes to poke into SLD.
P6	Page 6 (1536).
RAN	Random colour scroll flag.
AUTO	Auto disintegrate flag.
NPIC	Load next picture after time delay or keypress flag.
F$	List of picture files to be loaded.
T$	Temporary string.
COL(4)	Color register data.
W	Width of colour bands.
S	Speed of colour scroll.

```
0 REM ******************************
1 REM * PICTURE HANDLING UTILITY *
2 REM *       FOR ATARI USER       *
3 REM * BY MICHAEL A.BAXTER 1987 *
4 REM ******************************
5 REM
10 N=0:N1=1:N2=2:N3=3:N4=4:N5=5:N6=6:N
7=7:N8=8:N9=9:N10=10:N256=256:SLD=112*
N256:BYTES=320:P6=N6*N256:RAN=N1
11 AUTO=N:NPIC=N1:DIM F$(900),T$(20),C
OL(4):F$="":W=79:S=62:LDR=N1
12 DL1=PEEK(560):DL2=PEEK(561):OPEN #N
1,N4,N,"K"
20 POKE 201,N5:POKE 65,N
5000 GRAPHICS N:POKE 559,N:POKE 16,64:
POKE 53774,64:POKE 752,N1:POKE 709,14:
POKE 82,N:IF PEEK(SLD)=104 THEN 7000
5001 FOR I=N TO BYTES:READ A:POKE SLD+
I,A:NEXT I:RESTORE 5130:FOR I=N TO 101
:READ A:POKE P6+I,A:NEXT I
5003 FOR I=30000 TO 30052:READ A:POKE
I,A:NEXT I
5004 FOR I=SLD-N6 TO SLD-N':READ A:POK
E I,A:NEXT I
5005 FOR I=N TO 55:READ A:POKE 1700+I,
A:NEXT I
5009 DATA 104,160,1,162,129,142,64,127
,169,80,141,128,126,24,105,40,153,128,
126,144,1,232,138,153,64
5010 DATA 127,185,128,126,200,192,192,
144,235,169,27,160,0,32,38,113,162,4,1
60,17,185,80,159,157,196
5020 DATA 2,136,202,16,246,160,12,162,
3,185,80,159,157,116,159,136,202,16,24
6,169,0,141,112,159,174
5030 DATA 87,159,202,142,114,159,173,1
16,159,133,207,173,118,159,133,206,162
,0,142,113,159,32,216,112,201
5040 DATA 128,144,26,41,127,208,3,32,1
98,112,170,32,216,112,133,205,32,153,1
12,202,208,245,206,113,159
5050 DATA 16,240,48,220,170,208,3,32,1
98,112,32,216,112,133,205,32,153,112,2
02,208,250,206,113,159,16
5060 DATA 245,48,196,165,207,205,117,1
59,176,14,165,206,205,119,159,176,7,32
,183,112,165,205,145,203,32
5070 DATA 231,112,240,1,96,104,104,96,
164,206,185,128,126,133,203,185,64,127
,133,204,164,207,96,32,216
5080 DATA 112,48,233,141,113,159,32,21
6,112,170,208,3,206,114,159,96,142,115
,159,169,0,168,32,38,113
5090 DATA 48,209,174,115,159,96,173,11
4,159,240,22,230,207,165,207,205,117,1
59,144,12,230,206,173,116,159
5100 DATA 133,207,164,206,200,200,132,206,204,119,159,
96,164,206,200,200,132,206,204,119,159
,176,1,96,173,112,159,240,2
5110 DATA 230,207,73,1,141,112,159,24,
109,118,159,133,206,164,207,204,117,15
```

→

```
9,96,162,80,157,72,3,152,157
5120 DATA 73,3,169,7,157,66,3,169,80,1
57,68,3,169,159,157,69,3,76,86,228
5130 DATA 104,74,74,170,134,207,104,10
4,149,205,104,104,149,203,104,104,149,
208,202,16,241,162,6,160,81
5140 DATA 173,36,2,72,173,37,2,72,169,
7,32,92,228,166,207,181,203,24,117,212
,149,212,202,16,246
5150 DATA 141,10,212,166,207,180,205,1
81,212,153,22,208,202,16,246,173,252,2
,74,176,223,104,170,104,168
5160 DATA 169,7,32,92,228,96,166,207,1
80,205,181,208,24,121,196,2,153,196,2,
149,212,202,16,240,76,98,228
5170 DATA 16,16,80,67,0,0,3,2,2,48,0,2
,0,2,0,2,0,2,0,2,0,2,0,2,0,2,0,2,0,2,0
,2,0,2,0,2,0,2,0,2,0,2,0,2,48,3,3,3,0,
0
5171 DATA 65,48,117,255,255,0,112,64,1
13
5200 DATA 104,168,170,132,204,133,205,
165,89,72,173,10,210,201,31,176,249,13
3,203,165
5210 DATA 89,24,101,203,133,89,169,0,1
72,10,210,145,88,104,133,89,72,230,204
,165
5220 DATA 204,240,3,76,174,6,230,205,1
65,205,201,152,144,212,104,96
7000 POKE 30004,PEEK(88):POKE 30005,PE
EK(89):POKE 560,48:POKE 561,117:POSITI
ON N,N
7040 ? "      TOUCH TABLET/KOALA PICTURE
RUNNER      **************************
*********    ";
7044 ? ,"Programmed By M.A.Baxter 1987
":? :? :? :?
7050 ? " 1. ENTER PICTURE DISPLAY ORDE
R":?
7052 ? " 2. SET UP COLOUR SCROLL VALUE
S":?
7054 ? " 3. PICTURE DISINTIGRATE TOGGL
E ";:IF AUTO THEN ? "ON ":GOTO 7056
7055 ? "OFF"
7056 ? :? " 4. NEXT PICTURE BY ";:IF N
PIC=1 THEN ? "TIME DELAY/KEYPRESS":GOT
O 7058
7057 ? "TIME DELAY/KEYPRESS"
7058 ? :? " 5. START ART SHOW":?
7060 ? " 6. LEAVE PROGRAM":?
7062 POSITION N,21:? "            PLEASE
PRESS KEYS 1-6             ";:POKE 559,34
7082 GET #N1,A:A=A-48:IF A<N1 OR A>N6
THEN 7082
7085 ON A GOTO 7100,7200,7300,7400,750
0,7360
7100 GOSUB 7350:POKE 559,N:POKE 560,DL
1:POKE 561,DL2
7102 TRAP 7110:CLOSE #N2:OPEN #N2,N6,N
,"D:*.*":COL=N1:Y=N4
7103 POKE 559,N:INPUT #N2,T$:IF T$(11,
13)<>"PIC" THEN 7103
7104 POSITION COL,Y:? T$(N3,N10):Y=Y+N
1:IF Y>19 THEN COL=COL+12:Y=N4:IF COL>
30 THEN 7110
7106 GOTO 7103
7110 IF PEEK(195)<>136 THEN GOSUB 7350
:POSITION N,22:? "            CANNOT REA
D DISKETTE            ";:GOTO 7000
7111 POKE 560,48:POKE 561,117:POKE 559
,34:POSITION N,21:? "    NOW INDICATE P
ICTURE DISPLAY ORDER    ";
7120 COL=12:Y=N4:OCOL=COL:OY=Y:ORD=N1:
POSITION 12,N4:? CHR$(27);CHR$(126):F=
ORD:F$=""
7125 GET #N1,A:ON A<27 OR A>29 AND A<>
155 GOTO 7125:Q=A:IF A=28 AND Y>N4 THE
N Y=Y-N1:GOTO 7129
7126 IF A=28 AND Y=N4 AND COL>14 THEN
COL=COL-12:Y=19
7127 IF A=29 AND Y=19 AND COL<30 THEN
COL=COL+12:Y=N3
7128 IF A=29 AND Y<19 THEN Y=Y+N1
7129 IF A=155 THEN 7140
7130 IF A=27 THEN GOSUB 7350:POKE 559,
N:GOTO 7000
7135 POSITION OCOL,OY:? " ":POSITION C
OL,Y:? CHR$(27);CHR$(126):OCOL=COL:OY=
Y:GOTO 7125
7140 IF A=155 THEN LOCATE COL-11,Y,Z:C
OLOR 32:PLOT N,20:IF Z=32 THEN 7125
7150 LOCATE COL-N2,Y,Z:IF Z<>32 THEN C
OLOR 32:PLOT N,20:POSITION N,20:? CHR$
(N256-N3):GOTO 7125
```



```
7152 IF ORD<N10 THEN POSITION COL-N2,Y
:? "0";ORD:GOTO 7160
7155 POSITION COL-N2,Y:? ORD
7160 ORD=ORD+N1:G=11
7162 LOCATE COL-G,Y,Z:COLOR 32:PLOT N,
20:IF Z<>32 THEN F$(F,F)=CHR$(Z):F=F+N
1:G=G-N1:GOTO 7162
7163 F$(F,F)=".":F=F+N1:GOTO 7125
7200 GOSUB 7350:POSITION N,6:? "Colour
 Scroll Setup:":? :?
7205 ? "1. FAST SCROLL UP":? :? "2. SL
OW SCROLL UP":? :? "3. FAST SCROLL DOW
N":? :? "4. SLOW SCROLL DOWN":?
7206 ? "5. NO MOVEMENT":? :? "6. RANDO
M SCROLL"
7207 POSITION N,21:? "            SELECT O
NE OF THE ABOVE            "
7210 RAN=N1
7211 GET #N1,A:A=A-48:IF A<N1 OR A>N6
THEN 7211
7212 ON A GOTO 7220,7221,7222,7223,722
4,7225:GOTO 7211
7220 W=79:S=62:GOTO 7250
7221 W=79:S=143:GOTO 7250
7222 W=79:S=130:GOTO 7250
7223 W=79:S=129:GOTO 7250
7224 W=79:S=N:GOTO 7250
7225 W=N:RAN=N:GOTO 7250
7250 GOSUB 7350:POKE 559,N:GOTO 7000
7300 IF AUTO=N THEN AUTO=N1:GOTO 7000
7301 AUTO=N:GOTO 7000
7350 FOR G=N1 TO 20:POSITION N,N4:? CH
R$(157):NEXT G:RETURN
7360 GRAPHICS N:END
7400 IF NPIC=N1 THEN NPIC=N:GOTO 7000
7401 NPIC=N1:GOTO 7000
7500 GOSUB 7350:POSITION N,N6:IF F$=""
 THEN 7590
7501 ON NPIC GOTO 7510:? "Pictures wil
l be loaded one after        another af
ter a certain time delay."
7502 TRAP 7502:POSITION N,N9:? "Please
 enter time delay (in sec's)    ";CHR$
(30);CHR$(30);CHR$(30);CHR$(30);
7503 INPUT T:IF T<N THEN 7502
7510 ? "See picture loading ? Yes";:IF
  NOT LDR THEN ? CHR$(30);CHR$(30);CHR
$(30);"No "
7511 GET #N1,A:IF A=89 THEN LDR=N1:GOT
O 7514
7512 IF A=78 THEN LDR=N:GOTO 7514
7513 ON A=155 GOTO 7514:GOTO 7511
7514 TRAP 7514:F=N1
7515 T$="":T$="D:":FF=N3
7520 T$(FF,FF)=F$(F,F):F=F+N1:FF=FF+N1
:IF F$(F,F)="." THEN T$(LEN(T$)+N1)=".
PIC":F=F+N1:GOTO 7525
7522 GOTO 7520
7525 GRAPHICS 31:POKE 16,64:POKE 53774
,64:IF  NOT LDR THEN POKE 559,N
7526 OPEN #N5,N4,N,T$:X=USR(SLD):CLOSE
 #N5:POKE 559,34
7530 IF NPIC THEN 7555
7531 POKE 19,N:POKE 20,N:POKE 18,N:POK
E 756,N256-N1
7532 TT=(PEEK(18)*65536+PEEK(19)*256+P
EEK(20))/49:IF INT(TT)=T THEN ON AUTO
GOSUB 7560:GOTO 7515
7533 IF PEEK(764)=28 THEN 5000
7540 GOTO 7532
7555 GET #N1,A:A=A-48:ON A=-21 GOTO 50
00:IF A<N OR A>N4 THEN ON AUTO GOSUB 7
560:GOTO 7515
7556 IF  NOT RAN THEN W=INT(RND(N)*256
):S=INT(RND(N)*256)
7557 FOR G=N TO N4:COL(G)=PEEK(708+G):
NEXT G:X=USR(P6,A,W,S):FOR G=N TO N4:P
OKE 708+G,COL(G):NEXT G
7558 FOR G=1 TO 20:NEXT G:POKE 764,255
:GOTO 7555
7560 X=USR(1700):RETURN
7590 ? "You have not entered the pictu
re order  yet!":POSITION N,21
7591 ? "            PRESS ANY KEY TO CONT
INUE     "
7592 GET #N1,A:GOSUB 7350:POKE 559,N:G
OTO 7000
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
0	4273	1	6312	2	5298
3	5722	4	4273	5	871
10	18754	11	11459	12	7866
20	3829	5000	19123	5001	18578
5003	7933	5004	8787	5005	7602
5009	14361	5010	14376	5020	14276
5030	15018	5040	14518	5050	14369
5060	14873	5070	14575	5080	14323
5090	15165	5100	14823	5110	15130
5120	10385	5130	14784	5140	13613
5150	14841	5160	15169	5170	15896
5171	5478	5200	12122	5210	11430
5220	9363	7000	14007	7040	44073
7044	9573	7050	7245	7052	7262
7054	12811	7055	1097	7056	17215
7057	8389	7058	5282	7060	4250
7062	26800	7082	7425	7085	6465
7100	8771	7102	9770	7103	9040
7104	15388	7106	1878	7110	32704
7111	33218	7120	15192	7125	16176
7126	8788	7127	8821	7128	5134
7129	2939	7130	8045	7135	15470
7140	12301	7150	17097	7152	10110
7155	4748	7160	2938	7162	16929
7163	4732	7200	12074	7205	18912
7206	7641	7207	24739	7210	1184
7211	7410	7212	8447	7220	3679
7221	3694	7222	3686	7223	3690
7224	3366	7225	3983	7250	5811
7300	6321	7301	3160	7350	10575
7360	3076	7400	6211	7401	3181
7500	8014	7501	24388	7502	21094
7503	4995	7510	16303	7511	7324
7512	5170	7513	4791	7514	2801
7515	3303	7520	15758	7522	1883
7525	11945	7526	9164	7530	3046
7531	8638	7532	16328	7533	4344
7540	1897	7555	15581	7556	9485
7557	18076	7558	7722	7560	3864
7590	15230	7591	22520	7592	7553

Sounds exciting, but unfortunately...

IN Bob Chappel's review of Trivial Pursuit in the February edition of Atari User, he states "All you have to do is speak it aloud – there's no typing or selection of multiple answers".

I would like to know how the computer receives its voice input, what it uses for a microphone and whether it requires a voice print demonstration at the start so that it can understand your statements.

I don't know much about that side of the computer world, but if you don't need extra hardware for this maybe someone could write a routine to let the computer monitor your voice print in the way the review says this game does.

Of course I may have got the wrong end of the stick, in which case could you inform me of the true meaning of this statement.

Also, could you tell me if there is an 8 bit version of the Star Trek game you reviewed in Atari ST User last month.

– K. Swinton, Scunthorpe, South Humberside.

● When Bob Chappel reviewed Trivial Pursuit in the February issue of *Atari User*, he did say that all you have to do is speak aloud, but this was not meant to be taken too literally.

The computer, as it stands, has no ability to interprete speech patterns and when you play Trivial Pursuit you tell the other players of your True/False or Yes/No answer to the question.

The game works this way on a truth basis, depending on your typed input.

There is an old version of Star Trek about for the Atari 8 bit machines, but it is far cry from the one out for the ST. If a version comparable with the ST one ever comes out for the 8 bit we will certainly review it.

Missing switch box

I BOUGHT my Atari 130XE five months ago from Athens but I have not found the TV switch box which the manual makes reference to. **– Sabri Ghasholit, Tripoli, Libya.**

● The box referred to is only recommended for you to use, but you can manage fine without it. All it does is allow you to switch from the TV to computer without unplugging your aerial – and you do not actually get one when you buy the computer.

Costly error

I HAVE recently typed in Illuminations from the November issue of Atari User. I saved the program and checked it using Get-It-Right and I found some mistakes. But when I fried to load the program to correct them, Error-21 came up.

This has also happened with another program. Please could you tell me what is going wrong. **– Evan Proudfoot, Ratho Station, Midlothian.**

● Unfortunately, Error-21 indicates that your file did not save correctly to tape, so unless you made more than one copy we're afraid you will have to type the Illuminations program in again. A useful tip for the future is to ensure that you save your work several times. It may be that the tape you were using was of poor quality or that your tape heads may need cleaning.

Search for cartridges

I OWN an Atari 800XL with Data recorder, joystick and 100 games and I am looking for some cartridges, but can't find any.

Is the hole on the top for decoration? Can you use the old 2600vcs cartridges on an 800XL?

Also, is Beach Head available on cassette for my 800XL. If so where could I buy and for how much? **– M. Lee, Bingley, West Yorkshire.**

● A lot of software was changed to fit in the cartridge slot. However, your 2600 cartridges will not plug in and even if they did you would damage your computer.

Available cartridges include Galaxians, Gorf and Missile Command.

Beach Head is not available on tape, as the program refers back to disc all the time.

REPLACING A KEY

I HAVE a 1010 tape recorder which I use regularly, but recently the Record button broke in half. I know several people who have had this problem.

Could you please tell me of a company which sells separate keys, because it seems such a waste to buy a new tape recorder. **- Colin Bryson, Kilmarnock, Scotland.**

● Your letter shows a standard fault with the 1010 tape deck. The keys have a tendency to snap after a lot of use. The usual keys that break are Play and Record.

We don't know where you can get new keys but you have a Pause key that has little if any use. So you can swap it with the broken one.

To do this you unscrew the base of the tape deck and pull the front off very carefully, as two plastic lugs secure it.

You will see a grey coloured plug on the circuit board. Unplug it and you now have an unrestricted view of the keys, which are held in place by a metal bar and circlip.

Remove the circlip, pull the bar through and pull the keys upwards. Remove your Pause key and the broken key and swop them over, remembering to replace the small metal spring behind the keys.

Refit everything, and your tape recorder will be working again. We recommend you only do this job if your deck is out of warranty, otherwise take it back to where you bought it.

Cable conundrum

I HAVE just had to shorten the cable on my Atari Touch Tablet, but now have the problem of which coloured

→

wire from inside the cable goes to which pin in the joystick socket in my 800XL. I would be grateful if you could print the solution. – **D. Chatwin, Solihull, West Midlands.**

● It is recommended that when disconnecting any wires you always keep a record on paper of where all the wires go instead of cutting them off straight away.

Here are the pin numbers followed by the colour of the wires that go to the joystick plug:

(1) Brown	(6) None
(2) None	(7) Pink
(3) Orange	(8) Grey
(4) Yellow	(9) White
(5) Green	

Recorder troubles

We regularly have problems loading games on our 800XL. Nearly all our games are good quality, and if we go through a period where we cannot get a game to load, no other games load either.

I've used a head cleaner on the 1010 recorder, but it didn't improve the situation and I have checked that all wires are not crossed and that plugs and sockets are securely connected. I also ensure tapes are wound just beyond the leader before loading.

When our machine does not load the loading tone heard through the TV is often much softer and seems to sound higher pitched.

Loading will normally fail before the tape counter reaches 30. The screen will show Boot error or else the Atari will go into Self-check mode.

Do you know the address of Atari(UK) since our guarantee card has only the US address. – **Paul Heawood, Fareham, Hants.**

● It could be that your tape heads are out of alignment, and if this is so then we would recommend you take the deck to a dealer for adjustment. We do not suggest that you undertake this action yourself, due to the temperamental performance of 1010 data recorders.

You say you wind tapes just beyond the leader before loading. On most commercial software you should fully rewind the tape, or you will get a time out error on loading because Atari has a 19 second timer before data transmission.

The address of Atari (UK) is Atari House, Railway Terrace, Slough, Berkshire, SL2 5BZ

Menu Maker update

I WAS delighted when you published Menu Maker by Mark Cocker in the February issue of Atari User. *I have found it to be very useful and now include MENU .BAS together with the AUTORUN.SYS file on all my discs.*

There is, however, one problem with it. I discovered it when trying to load a rather large machine code program which required Basic to be turned off.

It appeared that although Basic was turned off the 8k of memory in which it resided was not available for use by other programs.

This program shows a modification to the original MENU.BAS program to allow this area of memory to be used.

Line 600 starts a subroutine to set up the new machine code in page 6. This is initialised by a GOSUB command inserted into line 10 and executed by X = USR(1536) in line 460.

This modification is well worth doing and puts the finishing touches to a very useful program.

```
10 GOSUB 600:GOTO 470
460 X=USR(1536)
600 DATA 173,1,211,9,2,141,
1,211,169,192,133,106,162,
96,169,12,157,66,3,32,86,
22,8,162,96,169,3,157,66,3,
169,37
610 DATA 157,68,3,169,6,
157,69,3,169,0,157,75,3,
169,28,157,74,3,32,86,228,
76,200,21,83
620 RESTORE 600:FOR I=1 TO
56:READ A:POKE 1535+I,A:
NEXT I
630 RETURN
```

– **Dr M.R. Holland, Merry Hill, Wolverhampton.**

Missing brackets

HAVING recently got into computing I bought an Atari 600XL expanded to 64k. I have come accross two problems which I hope you can solve for me.

Firstly I have been given Compute's Atari Games Collection Vol.1, and I am having problems typing in most of the programs. This is caused by the fact I am unable to fathom how to input the curly bracket characters.

An example of a line using these signs is as follows:

```
PRINT #6;"{224 Spaces}"
```

I have tried using ordinary brackets but to no avail. Have you any suggestions?

Secondly, when typing in lines from a program the computer sometimes seems to freeze and has to be abandoned. This always happens when the Return key has been pressed and the cursor returns to the next line but will then not move any further no matter what key is pressed.

I hope you or your readers can shed some light on my problems, and thanks for a really first class magazine. – **R.Masson, Castlemead, Bournemouth.**

● It is not surprising that you are having problems, as these brackets do not exist on the Atari.

When the line says *"224 Spaces"* it means that you open the quotes, press the space bar 224 times then close the quotes.

You are not meant to enter the text, merely follow what it means.

In answer to your second problem, this plagues most XL machines and the old 400/800 ones. It has to do with your operating system, and when a lot of text is edited it is possible for the Atari to get a bit confused and crash, thus losing all your work.

It is highly recommended that before editing a program you should always save it.

Alternative languages

KEEP up the good work, and may Atari User continue to improve. As a relative newcomer to computing, although I am a very fast learner, I find that the intricacies of machine code elude me.

I am fairly competent in Basic but I am becoming bored with it. So I began to look for another language.

Action! was my first choice, but sadly beyond my budget, so I fell back on Atari Logo. I've been using it for about a week now, and it's fascinating.

So how about running a page as a regular feature devoted to, if not Atari Logo, then alternative languages in general, with programming features, reviews – in short, a mini magazine? After all, D.Radburn says the Atari is just made for Logo!

I wonder if any other readers agree? – **R. Robinson, Doncaster.**

● We are discussing the

idea of covering more languages. Contributions from readers are always welcome and would help us start such a service.

The secret of line 5

I AM having problems typing in "Just like the real thing" from the April 1987 issue of Atari User. *I have typed it in exactly as you printed it, but the computer always comes up with an error message at line 5.*

What am I doing wrong? I own an Atari 800XL computer so has this anything to do with it?

Do I need some sort of cartridge to be able to type in this sort of program or must I first poke in some sort of code?

Typing in these listings gives me lots of enjoyment so please can you help me out of this dilemma. – **B. Ellis, W.Glamorgan.**

● Your problem is that you are attempting to type in an assembler listing from Basic.

This will not work, as the computer cannot understand the syntax that you are entering. So you need an assembler editor cartridge or some kind of assembler language to enter this listing.

If you read the article you will see that the listing on page 16 of the same issue gives a Basic version of the program to emulate the one that you are cannot enter. Your 800XL is working fine so you have no worries on that scene.

A memory problem

I HAVE recently bought an Atari 130XE and a 1010 tape recorder and I am having trouble saving programs that I have typed in.

Could you please tell me where I am going wrong. – **S. Miller, Middlesbrough**

● Unless you have got faulty equipment you should not be having any problems.

With a program in memory and the Ready prompt on the screen, press the Record and Play buttons at the same time on your 1010 then type CSAVE and press the Return key twice.

The program will then be saved to tape. If this does not work then you must have a problem with your tape recorder or computer. If this is the case you should contact your dealer.

No joy with the socket

I RECENTLY bought an Atari computer system and joystick. When I tried the joystick on my computer I found to my horror that it would not fit.

My joystick has a round connector on it with lots of pins inside and I cannot find a suitable socket on my Atari to put it in. – **B. James, London.**

● It appears that you have a BBC joystick in the place of an Atari one.

There is no way that this joystick will work because apart from the fact that the sockets are different the BBC Micro uses an anologue input and the Atari digital. You need to buy a standard Atari joystick.

How to Get It Right

I OWN an Atari 130XE and I enjoy typing in the listings you publish in Atari User. *But I would like to know how to use your Get It Right program.*

I think it would be a good idea to publish the listing for Get It Right again for those people who missed it when you printed the listings. – **Sharon Boodle, Manchester, Lancs.**

● In the August 1986 issue of *Atari User* we printed a revised version of Get It Right and it is very simple to use. After you have typed in the program listing make two copies of it: A CSAVE version and an Ascii version.

The latter is obtained using the LIST"D/C: command where D/C indicates a disc or cassette version.

When you have saved your program in this form simply load in your GIR program and run it.

A menu will be displayed and you just choose the first option. Then you will be asked for the filename of your program and the GIR will then load it and display a checksum of the listing.

Once this has been obtained you simply compare this to the one in the magazine making a note of any that do not match. You can then reload your program and make any changes needed.

The GIR listing and instructions also appeared in the December 1985 and March 1986 issues of *Atari User*. Unfortunately it begins to be repetitive and annoying to readers if we publish it too often.

We have plans, however, to publish a new enhanced version in the near future.

Expanding a modem

I OWN an Atari 800XL with disc drive and now wish to expand into a new area. I have decided to purchase a modem and saw a Modem 1000 advertised in a magazine with BBC cables.

Will this connect to my Atari without modification? – **Christopher Coyle, Suffolk.**

● The Modem 1000 will work on your Atari but not with the leads being offered. You will need a special one to connect from the micro's serial port to the modem and you will also need communications software.

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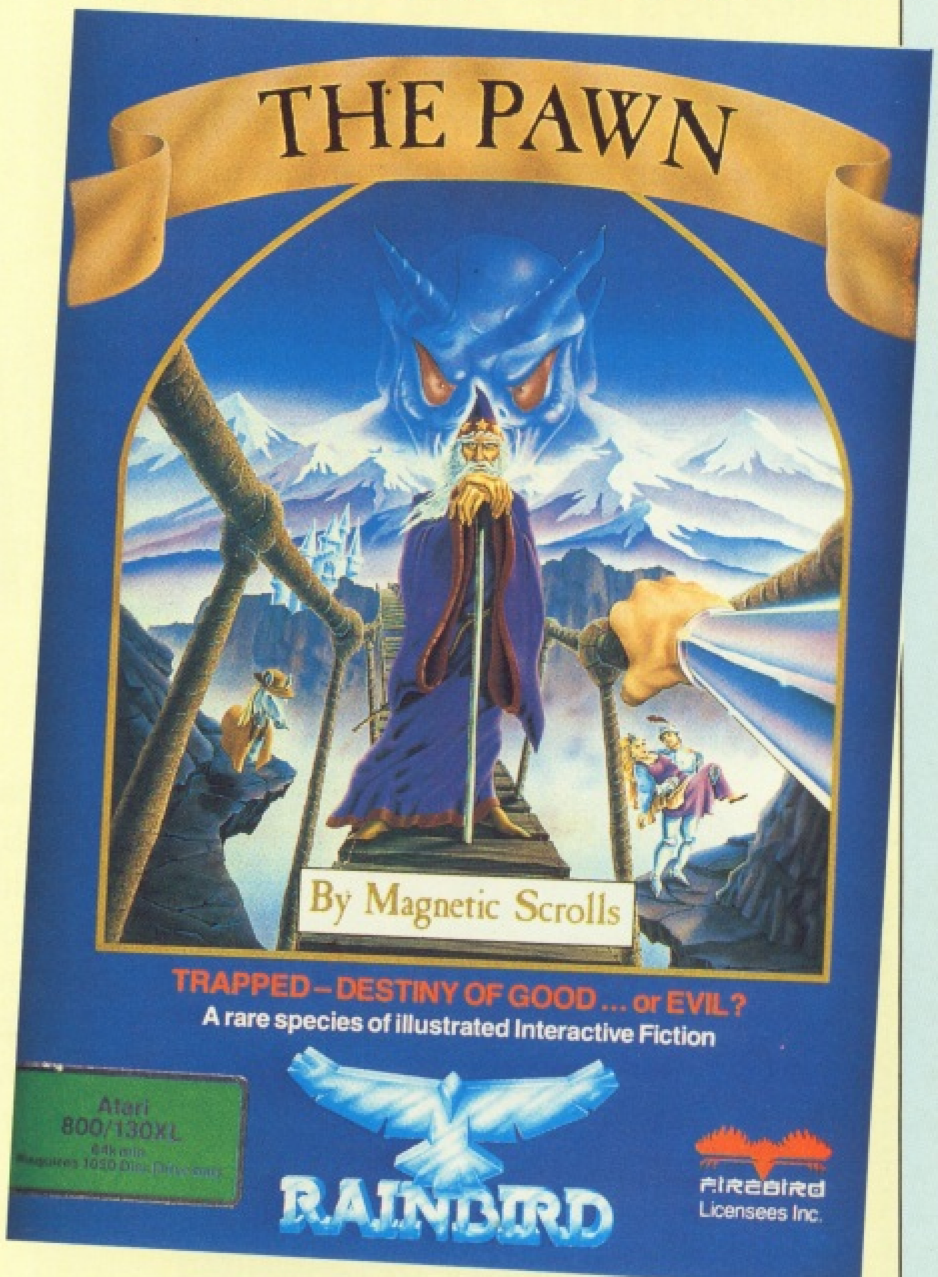
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– Anthony Ginn, writing about the Atari ST version in the May 1986 issue of the Atari User



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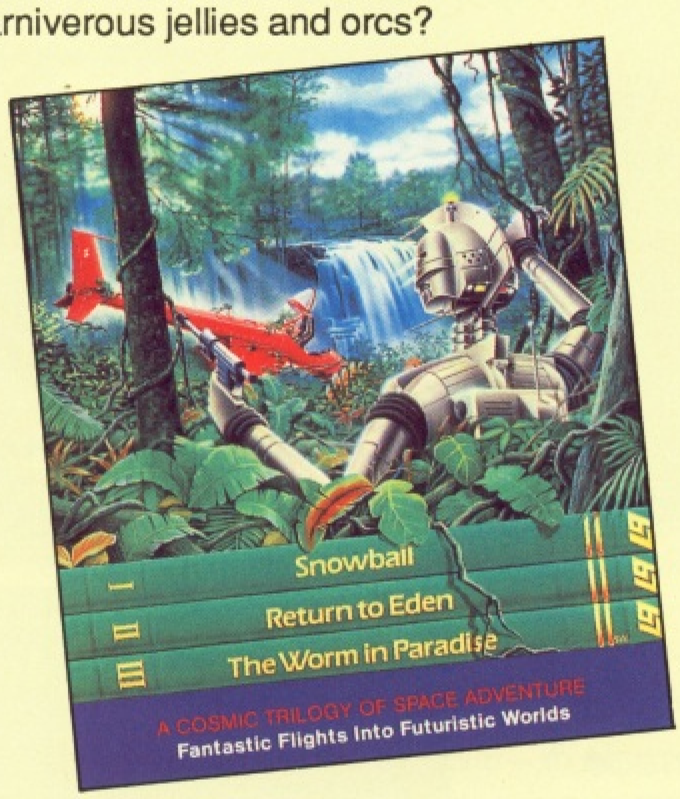
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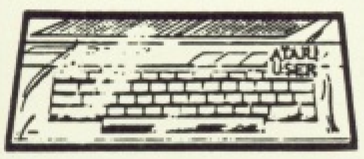
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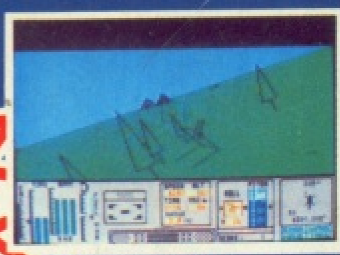
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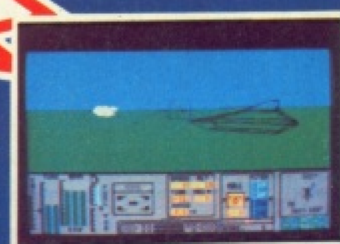
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